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NEWSPAPER

# U.S. Drops IBM Suit, Settles With AT&T

## *• But Snag Develops as Judge Refuses to Dismiss Bell Case*

**By Jake Kirchner**
CW Washington Bureau

WASHINGTON, D.C. — Settlement of the government's antitrust suit against AT&T hit a snag last week when the presiding judge said he would not dismiss the suit until he can arrange to receive and consider public comments on the settlement agreement.

Federal Judge Harold H. Greene said in a crowded hearing Tuesday that he was pleased the two sides had reached agreement, but he refused to dismiss the case, as requested by both the Justice Department and AT&T. Mere assurances from the two parties that other interested parties would be able to participate in the settlement did not satisfy federal antitrust law, he claimed.

Although Greene said "I am delighted this settlement has been reached" and called the agreement "a good settlement," he was clearly angry about how the two sides had handled the legal procedures for ending the seven-year-old case.

At issue, the judge said, were the provisions of the 1974 Antitrust Procedures and Penalties Act — referred to as the Tunney Act — which calls for a judge to oversee out-of-court settlements of government antitrust cases. The act sets a 60-day comment period for the public and interested third parties and allows the judge to modify or reject a proposed settlement agreement in order to protect the public interest.

AT&T and the Justice Department said the Tunney Act does not apply in this case because the lawsuit was ended, they contended, not with a settlement but with an agreed-upon modification of the existing 1956 Consent Decree between the two sides. But both said they fully intended that Greene would have au-

*(Continued on Page 11)*

## Pact 'Modifies' Consent Decree

**By Phil Hirsch**
CW Washington Bureau

WASHINGTON, D.C. — The settlement of the U.S. vs. AT&T antitrust case reached by the government and the telephone company on Jan. 8 "modifies" the 1956 Consent Decree that bars AT&T, with certain exceptions, from offering communications products and services on an unregulated basis.

The settlement, known officially as a "modification of final judgment," has yet to be approved by federal Judge Harold H. Greene, who has been presiding over the antitrust trial (see story above).

Besides permitting AT&T to offer communications products and ser-

*(Continued on Page 10)*

## *• Justice Department Decides IBM Case 'Without Merit'*

**By Bob Johnson**
CW New York Bureau

NEW YORK — The Justice Department has dropped its landmark antitrust suit against IBM, ending the government's attempt to prove that the company monopolized the computer industry.

A dismissal stipulation filed Jan. 8 with Judge David N. Edelstein in the Federal District Court for the Southern District of New York here stated that the government had reviewed the case and concluded that it "is without merit and should be dismissed."

The case was dropped only nine days short of its 13th anniversary after several meetings between U.S. Assistant Attorney General William F. Baxter and his trial team and IBM counsel, headed by attorney Thomas D. Barr of Cravath, Swaine and Moore. Both parties agreed to pay their own costs.

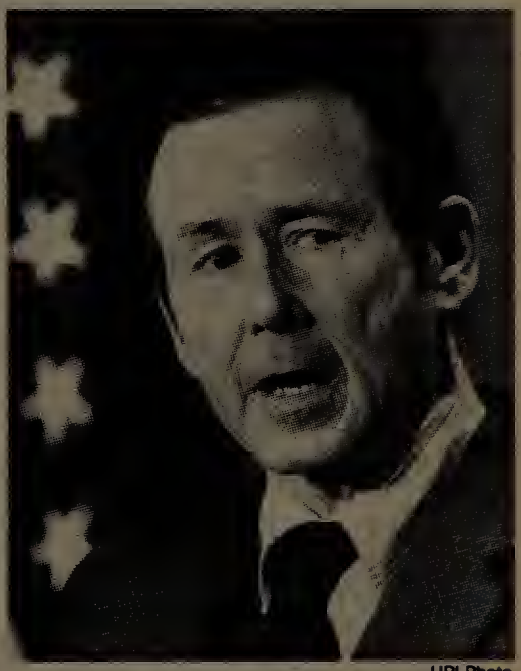
The case against IBM, referred to by former Solicitor General of the U.S. Robert Bork as the "Antitrust Division's Vietnam," began on Jan. 17, 1969, the last business day of the Johnson administration. On that day, then-U.S. Attorney General Ramsey Clark filed a complaint charging IBM with monopolizing interstate trade and commerce in the general-purpose digital computer market. The government's objective was to break up IBM into smaller companies.

The government estimated that it could present its case in 60 days; in fact, it took nearly three years.

Between the filing of the complaint in 1969 and 1972, the case was dominated by the discovery process, with both sides trading data in preparation for the trial. An estimated 30 million pages of paperwork changed hands during this time.

*(Continued on Page 8)*

## Bigness Not Bad, Baxter Explains



UPI Photo

**William F. Baxter**

**By Jake Kirchner**
CW Washington Bureau

WASHINGTON, D.C. — Big is not necessarily bad and any company should feel free to capture as much of the computer market as it legally can, U.S. Assistant Attorney General William F. Baxter said in explaining his decision to drop the government's antitrust suit against IBM.

Baxter, head of the Justice Department's Antitrust Division, told a Jan. 8 press conference here that it is "perfectly clear that IBM obtained its market share in an entirely legal way" and that the company should not be penalized "simply because it is large, highly successful and captures a large market share."

After studying the trial record over

*(Continued on Page 8)*

### ANALYSIS

## *The AT&T Settlement: Whose Victory?*

**By Phil Hirsch**
CW Washington Bureau

The out-of-court settlement that ends the U.S. vs. AT&T antitrust case changes Bell from a telephone company to an information company.

The settlement negotiated by AT&T and the U.S. Justice Department requires Bell to divest its 22 wholly owned operating companies as a quid pro quo for getting out from under the 1956 Consent Decree that barred it from offering communications products and services on an unregulated basis. With the divestiture AT&T will lose control of local loops across the land but will gain freedom to exploit "computer communications."

One question many observers were asking last week was whether this horse trade represents a victory for Bell or for the government.

At the press conference announcing the settlement, AT&T Board Chairman Charles Brown implied that AT&T did not win. "It was not the outcome we sought," he explained, adding that the settlement "had to be now, for neither the company nor the industry nor the consumer could tolerate further delays in bringing the new technology to market."

A different interpretation, however, is possible. Al-

*(Continued on Page 12)*

INSIDE
- THE END OF THE IBM CASE: *What Users Think, What Software Vendors Fear, Whether IBM Will Change How It Does Business*
- THE BELL SETTLEMENT: *What Concerns Vendors, What Congress Still Wants*

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## *DP-Based Superbowl Prediction*

# Goode Picks Bengals by a Whisker

**By Bruce Hoard**
CW Staff

LOS ANGELES — Cincinnati by .55 of a point in the Superbowl.

So says Bud Goode, *Computerworld's* peerless pigskin prognosticator and computer-based sports impresario. According to Goode and his regression equation, the Bengals will defeat the San Francisco 49ers in Superbowl XVI, January 24, behind an offense that ought to score 25.5 points and a defense that should allow 18.7

The underdog 49ers should ring up 23.4 points on the Pontiac, Mich., Silverdome scoreboard while yielding 17.2 on defense. Such will be the case if both teams are statistically true to the performances they turned in during the 16-game regular season.

Goode knows they won't be and he is the first one to admit it. He would never encourage you to go out and bet your lunch money on his prediction, which will appear in the *Philadelphia Inquirer* and *Houston Post* later this week. As he has said many times, "I do not incite to bet."

"I've been admitting that you cannot beat the line in a statistical sense for years," he said. This year, however, he has done just that, picking around 120 winners out of 224 regular season games and five of eight in the play-offs. "But that's a lucky year," he maintains.

The man who uses a Univac 1100 computer to produce a lengthy weekly statistical report for several National Football League (NFL) coaches (not including the 49ers' Bill Walsh and the Bengals' Forrest Gregg) has had the Bengals and 49ers pegged as Superbowl favorites since Week 13 of the NFL season.

Beyond that, he and he alone among football forecasters predicted that Cincinnati would be a co-winner of the league's American Football Conference (AFC) before the season started. Updating his rankings weekly, he has had the Bengals ranked as AFC favorites since after Week 9.

### Horse Race

San Francisco didn't top the National Football Conference ratings heap until Week 13 because, as Goode put it, "It's like a race, right? They're out of the post and they're trailing."

At the halfway mark, the 49ers were up on 100 of 130 variables, had no change on 10 variables and were weak on only 10. "Coming down the stretch they emerged at the eighth pole neck and neck with Philadelphia and driving to the finish, Philly falls out and San Francisco finishes ahead," he concluded, boiling the season down with a metaphorical flourish.

Sports statistic mongers will be interested to know Goode's key criterion is yards per pass attempt — gained and allowed.

In that department, Cincinnati averaged 6.83 offensively behind the throwing of quarterback Ken Anderson, while the 49ers rode the arm of Joe Montana to an offensive figure of 6.49 yards.

Defensively, the Bengals gave up 5.78 yards per pass while the even stingier 49er defense surrendered 5.18, Goode noted.

Just in case you were wondering but too embarrassed to ask, a "sack" — the tackling of the quarterback behind the line of scrimmage before he can throw a pass — is considered an incomplete pass in Goodean statistics.

Along those lines, he has come up with a new statistic for next season: first downs gained by a quarterback running. The category is significant because it is an indication of ball control, one of football's most hallowed goals.

Asked what it would be if he could add one nonquantitative, intangible element to his strictly quantitative and tangible regression equation, Goode replied, "I'd like to get some psychological measure of motivation."

This he would do through a "psychometric test" involving the "pooled judgments" of a group of pro coaches who would tour the contestants' locker rooms before the game, picking and probing the delicate psyches of the combatants in an effort to ascertain their state of readiness.

It's not easy to get his gut feeling on the outcome of Superbowl XVI. He hems and haws and says there's no way to really tell. Goode is vigilant against the unpredictable bounces of what he calls the "obloid spheroid." So when in doubt, fall back on the old regression equation: "I don't know," he said. "I think Cincinnati. I think a one-point edge is a one-point edge."

# This Week

## IN DEPTH

Keeping a Lid on Software Costs . . . .Follows Page 60

## NEWS

Software Vendors Brace for Stiffer Competition . . . . .4
Milestones in U.S. vs. IBM Case . . . . . . . . . . . . . . . . .6
Economist Sees 'Wide Open Door' to Monopolies . . .9
Industry's First Concern: Local Transmission . . . . . .10
AT&T Pact Sparks Congressional Concern . . . . . . . . .11
Deputy CIA Director Wants DP Research Review . . .12
Reactions to Settlement Show Debate Not Over . . . .13
PBX Called Communications Key to OA . . . . . . . . . .14
AT&T Exec Drops Hints About Videotex Plans . . . . .15
Quality Circles Recommended for Productivity . . . . .16
Candle Corp. Analysis Sees End for MVS/370 . . . . .17
Consultant: Let Vendors Choose CICS Tools . . . . . .18
Hardware Changes Said Mark of DP Evolution . . . . .19
Managers on the Move . . . . . . . . . . . . . . . . . . . . . .20
Lloyd's Insures Against EFT Theft . . . . . . . . . . . . . . .22
Graphics Touted as Major Productivity Tool . . . . . . .24
HP Execs Endorse IEEE Local-Net Standard . . . . . .25
NBS Searchs for Model to Prevent Future Fires . . . .26
Off the Press . . . . . . . . . . . . . . . . . . . . . . . . . . . . .27
Courting Disaster Unnecessarily? . . . . . . . . . . . . . . .29

## EDITORIAL

Editorial: Will Losers Be Users? . . . . . . . . . . . . . . . . .32
Editorial: What Happens Now? . . . . . . . . . . . . . . . . . .32
Softline: Communications Confusion . . . . . . . . . . . . .33
Sociology of Computing: Buzzword Seminar . . . . . . .33

## SOFTWARE & SERVICES

DBMS — Foremost a Consumer Product . . . . . . . . . .41
Enhancements Added to 'Scert II' . . . . . . . . . . . . . . . .43
Dylakor Adds Version of 'DYL-Audit' for CMS . . . . . .44
Financial Products Introduced for HP 3000 . . . . . . . .46
File Management Package Fits DG Nova . . . . . . . . . .49
Development Methodology Enhanced . . . . . . . . . . . .50
Operating System, Cobol for PDP-11 Get Updates . .51
Management Modules Designed for Wang 2000 . . . .52

## COMMUNICATIONS

Portable Terminal Helps Keep Homeowners Warm . .53
Devices Give 3270s Access to Public Nets . . . . . . . .57

## SYSTEMS & PERIPHERALS

System Easing Claims Handlers' Jobs . . . . . . . . . . . . .61
Peripheral-to-Node Unit Fits Domain Machine . . . . . .65

## MINIWORLD

Mini Halves Staff Handling Phone Calls . . . . . . . . . . .67

## OFFICE AUTOMATION

Some User Sites Integrate DP, WP Functions . . . . . .69
Magna III Gets Communications . . . . . . . . . . . . . . . . .70

## COMPUTER INDUSTRY

STC Chairman Offers His Tactic for Success . . . . . .71
Industry Officials Worried About U.S. Export Policy . .71
HP Earnings Rise 16%, Revenues 15% in 1981 . . . .73
Consultant Sees Thin Market for OA in Europe . . . . .79
ADVERTISING INDEX . . . . . . . . . . . . . . . .110

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## *With Dropping of U.S. vs. IBM*

# Software Vendors Brace for Stiffer Competition

By **Lois Paul**
CW Staff

Stiffer, more aggressive competition from IBM is unavoidable with the dropping of the antitrust suit against the firm by the Justice Department.

That was the predominant feeling among major software vendors contacted by *Computerworld* last week.

Some software vendors pointed to the possibility of IBM again bundling software as a possible result of the dropped suit. "I was hoping that the Justice Department would do something so IBM would not be able to bundle again," Martin Goetz, senior vice-president of Applied Data Research, Inc., said.

Several vendors, including Bruce T. Coleman, executive vice-president of Informatics, Inc., referred to IBM's recent announcement of the Small Systems Executive (SSX/VSE) operating system, which includes productivity aids, prompters and sorts in a "bundled" package [CW, Nov. 23].

Asa Lanum, vice-president for development at Pansophic Systems, Inc., said bundling is not necessarily to IBM's benefit. However, he predicted a continued trend to tie less competitive IBM software products to those for which the vendor has no real competition, particularly in the area of teleprocessing.

### Return to Aggression

John Cullinane, president of Cullinane Database Systems, Inc., expressed the concern that IBM will return to the "particularly aggressive marketing practices" that led to the antitrust suit. Citing the Reagan administration's stance favoring big business, Cullinane said, "I would expect to see IBM become even more formidable in the marketplace over the next few years and operate in a manner which shows an impunity from any kind of action on the part of the federal government."

Goetz agreed with this viewpoint, stating that in the short term the effects will not be that noticeable: "Hopefully the market is big enough for lots of companies, as IBM keeps saying." His major concern is that "IBM will not have the Justice Department looking over its shoulder."

This feeling that the suit's dismissal will cause IBM to be less cautious in its business practices was shared by Informatics' Coleman. "I think that for a while the suit had positive effects," he said, explaining that the suit sensitized IBM within the industry and led to better channels of communication with the company. "IBM is, I think, cycling into more aggressive competition. The small-end hardware and software companies need to be careful that IBM does not crush people."

### Detrimental Effect

Pansophic's Lanum foresaw a detrimental effect of the dropped suit on the software industry and, ultimately, on users who may face the loss of competitive pricing and flexibility of choice. He, like other vendors, recalled the '70s as a time of increased competition and growth within the independent software industry.

This may change now that IBM no longer is concerned about the legal suit, he explained, leading to both a reduction of competition from other software vendors, as well as a prevention of new competition as companies hesitate to enter the market.

IBM's freedom from the long-standing antitrust suit apparently presents less of a concern for application software vendors than for developers of systems and utility packages and for the service bureau industry, which faces IBM's rumored reentry into this marketplace.

John Imlay, chairman of the board of Management Science America, Inc., believes IBM has been operating as if it won the suit since early last year. Referring to IBM's meeting with independent software vendors to encourage the development of application software for some of its hardware line [CW, Nov. 9], Imlay said, "I don't see any drastic change from their attitude of friendliness on Oct. 26."

The ending of the suit is a positive stroke for the computer industry in that it will enable IBM to face the "Japanese invasion," according to James McCormack, chairman of the board of McCormack & Dodge Corp. "I think that in terms of computer technology, IBM is the domestic flagship. Why put handcuffs on them when you are getting so much international entry into the domestic market?"

Thomas M. Nies, president of Cincom Systems, Inc., predicted that IBM will be able to drop some of its lower equipment line offerings and have a more unified product line.

However, IBM also will become more aggressive in its software marketing, he continued, and as a result, some segments of the software business may be devastated. "We feel there is always room for a strong No. 2 in any market; but a distant third or fourth, we are not so sure about."

---

# *Users Say Dismissal of Suit Won't Affect Their Operations*

By **Tom Henkel**
CW Staff

IBM users contacted last week either did not know or did not care that the government has dropped its 13-year antitrust suit against IBM.

None of eight users contacted felt that the suit's dismissal would have any adverse influence on their operations. Some said it will make IBM easier to anticipate, some said it was a good sign and others said they just didn't care.

While certain software vendors are concerned about the possibility that IBM will start bundling its software again (see story above); most of these users nixed that idea. Charles C. Oldenberg, general manager of computer services at the San Francisco-based Standard Oil Co. of California, speculated that IBM may start hiding more of its software in microcode in efforts to restrict competition, but he also noted that from the vendor's standpoint, microcode is harder to maintain.Thus, he concluded, IBM may not place too much of its software in microcode.

### Positive Influence

In general, dismissal of the IBM case will have a positive influence, according to Oldenberg. Now that the possibility of IBM being broken up into smaller companies has been eliminated, IBM's marketing efforts will probably take on a more predictable air, he noted. The user of four IBM 3033s, five 370/168s, a 370/158 and several Amdahl Corp. plug-compatible processors, Oldenberg said the dismissal and IBM's recent reorganization may make the firm's product line more consistent.

An all-out effort to rebundle IBM software could backfire, according to Richard J. Royston, division director of the Applied Math Division of Argonne National Laboratory in Argonne, Ill. With the proliferation of superminicomputers that can often perform the same types of applications as larger mainframes, Royston said that IBM could lose potential mainframe customers to the supermini vendors by rebundling.

Instead, Royston expects further unbundling by IBM. The 8100, for example, would be more attractive if users had more software flexibility, he said. He pointed to IBM's Personal Computer as an example of how a completely unbundled system would be advantageous.

Bundling software or developing more extensive microcode could conceivably provide some advantages to IBM users. Harold J. Baer, director of corporate management information systems at International Paper Co. in New York, said that more microcode would require IBM to have major software components like operating systems working properly on the first try. Baer's shop includes a 3033, 370/168 and a 370/158.

### Plug Compatibles

The dismissal may have some impact on the manufacturers of plug-compatible mainframes, especially if IBM starts bundling software, Baer noted. But International Paper has always been an IBM shop and the plug-compatible manufacturer's plight is not one of his major concerns, he said.

Other users had even less to say about the suit's dismissal. One user had too many year-end problems to worry about IBM's court battles while others simply said it did not matter.

Several DPers stepped out of their roles as computer czars to say that the conclusion of the trial is a good thing because it is saving a lot of taxpayer money that would be spent arguing over what appears to be a foregone conclusion.

Others, however, seemed curious about what impact the AT&T settlement would have on IBM's business. Although users felt that the AT&T settlement would have some affect on IBM, few seemed to put much faith in the longstanding rumor that AT&T plans to jump into the computer services business. While not ruling out that possibility, few felt IBM is in imminent danger.

Royston, for example, pointed out that the cost of developing and maintaining software is far higher than the cost of the hardware that runs it. Therefore, he speculated, a large-scale computer services venture by AT&T might not be as inexpensive as everyone thinks.

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# Analysts Expect No Changes In IBM's Ways As Suit Ends

By **Marcia Blumenthal**
CW Staff

"It's going to be business as usual at Armonk" was the gist of the reaction expressed by computer industry analysts and vendors to the Justice Department's abrupt dismissal of its 13-year-old antitrust suit against IBM.

"IBM has been acting like this was going to happen for the past three years. It's been a farce that has gone on for too long," said Thomas Crotty, a vice-president with the Gartner Group, Inc., a market research group based in Stamford, Conn.

IBM's reorganization of its marketing structure last October, allowing all IBM sales divisions to market the company's full range of products, was a signal that the antitrust suit was a dead issue, many observers believe.

The sudden fizzling of the suit was seen as a psychological victory for IBM. The stock market acted accordingly as stock prices for some of IBM's competitors dropped during the days following the Justice Department's action on Jan. 8.

One of the eventual results of the case's disposition will be that IBM will have more clout in its de facto standards-setting behavior, maintained David N. Martin, executive vice-president of National Advanced Systems (NAS).

Another impact seen by some analysts would come from IBM's ability to exert more pricing pressure on its traditional mainframe competitors and plug-compatible vendors, if it chooses to do so. Because a significant portion of IBM's profits come from the mainframe portion of its business, the firm could adjust prices downward for these products in order to squeeze its mainframe adversaries.

*(Continued on Page 6)*

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ATLANTA MAR. 8-12
BALTIMORE MAR. 15-19
MINNEAPOLIS MAR. 22-26
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# *Milestones in the U.S. vs. IBM Case*

**When U.S. vs. IBM went to trial in May 1975, Raymond M. Carlson (left) and Joseph H. Widmar headed the Justice Department's team.**

- **1967:** The U.S. Department of Justice initiates an investigation of the DP industry.

- **Jan. 17, 1969:** On the last business day of the Johnson administration, just before 4:30 p.m., Attorney General Ramsey Clark files the 12-page U.S. vs. IBM suit, 69 Civ. 200, in the Federal District Court of the Southern District of New York. The suit charges IBM with monopolizing the general-purpose computer market. Requested relief includes breaking up IBM into smaller companies.

- **1970:** The Justice Department decides to rely on copies of documents selected by lawyers for Control Data Corp., then involved in a private antitrust suit against IBM.

- **January 1972:** David N. Edelstein, then Chief Judge of the Federal Court for the Southern District of New York, decides to preside over the case as sole arbiter.

- **October 1972:** IBM proposes that a separate trial be held on the issue of market definition. The Department of Justice objects and is upheld by Edelstein.

- **July 1974:** Both sides inform Edelstein they have completed depositions from all witnesses.

- **Nov. 1, 1974:** Over IBM's objections, the Justice Department's Antitrust Division enlarges the scope of its complaint, adding charges from the Telex Corp. vs. IBM suit in which Telex was awarded $352 million in September 1973.

- **Jan. 24, 1975:** The Court of Appeals in Denver reverses the Telex decision and rules in IBM's favor; but Telex claims remain in the U.S. vs. IBM case.

- **May 19, 1975:** The U.S. vs. IBM trial begins, six years after filing.

- **April 1977:** The Justice Department names a new lead counsel, its third in the suit.

- **June 22, 1977:** The Department of Justice petitions Edelstein to reopen discovery and redepose 28 of IBM's witnesses. Edelstein grants its petition.

- **Dec. 20, 1977:** IBM moves for mistrial, contending that the testimony of government witness Dr. Alan K. McAdams included changes in definitions of the relevant market that were serious and fundamental. Edelstein denies IBM's motion.

- **April 26, 1978:** The government rests its case after 473 days in court, 52 witnesses, more than 3,200 exhibits and almost 72,000 pages of transcript. IBM waives its right to move to dismiss the case on grounds of insufficient evidence. The Justice Department's lead counsel leaves government service; new counsel (its fourth) takes over.

- **February 1979:** With Edelstein's consent, the Justice Department subpoenas IBM Chairman Frank T. Cary (already questioned for 35 days at depositions and three days on the stand in other trials).

- **March 1979:** The Cary subpoena is withdrawn. The Justice Department agrees to take Cary's testimony by deposition and his previous testimony given in other cases. IBM agrees Cary's testimony would deal only with pre-1974 matters.

CW Photos

**Besides the judge in the case, the only person involved in the start of the trial that stayed until its dismissal was Thomas D. Barr (second from right), head of IBM's defense team. In this 1975 photo, Barr is shown with other lawyers from New York's Cravath, Swaine & Moore law firm.**

- **June 1979:** IBM is ordered to make more documents available. It responds with the claim that compliance would cost too much in time and money.

- **July 17, 1979:** IBM asks Edelstein to remove himself from the case because of bias and prejudice against IBM.

- **Sept. 11, 1979:** Edelstein issues a ruling in which he refuses to remove himself. IBM goes to the Court of Appeals.

- **February 1980:** The Second Circuit Court of Appeals denies IBM's petition saying, among other things, that too much time has already gone by in the trial.

- **March 10, 1980:** IBM asks the Court of Appeals to reconsider its rejected motion to remove Edelstein.

- **April 23, 1980:** The Court of Appeals denies IBM's requests for a rehearing.

- **April 1980:** IBM says it will negotiate no further unless the Justice Department drops the precondition that the government will not settle the case for anything less than structural relief, which would change the makeup of the industry. Attorney General Benjamin Civiletti says the department's position has never been that divestiture was a precondition. IBM and Justice Department negotiators meet to discuss additional procedural aspects of the settlement talks.

- **July 1980:** The trial is moved from the largest courtroom in the Federal Courthouse at Foley Square to a courtroom half the size in the same building. Action winds down as the trial is conducted largely on paper.

- **April 9, 1981:** IBM moves for dismissal or mistrial on the grounds that "the proceedings have been incurably tainted and IBM thereby prejudiced by the wrongful and plainly erroneous access plaintiff sought and was granted to documents subject to attorney-client privilege and work production protection." IBM cites the Superior Court ruling in Upjohn Co. vs. U.S., which expanded the privilege of confidentiality between lawyers and their clients.

- **April 1981:** Edelstein sets a June 1 deadline for the end of the trial, his first such public declaration. At the same time, Edelstein denies IBM's motion for dismissal or mistrial. The judge offers his services to both parties in efforts to make an out-of-court settlement.

- **June 1, 1981:** IBM and the Justice Department rest the case. IBM accepts Edelstein's offer to help settle the case. Edelstein sets a June 10 date for meeting with both sides and invites U.S. Assistant Attorney General William F. Baxter to attend.

- **June 1981:** Baxter asks a 60-day delay for the start of post-trial proceedings, from Oct. 1 to Dec. 1, to allow for his self-education about the trial.

- **Jan. 8, 1982:** The Justice Department unexpectedly drops its suit, saying the case is "without merit and should be dismissed." The announcement comes in simultaneous 4 p.m. press conferences called by Baxter in Washington and Edelstein in New York.

# Analysts React To End of Suit

*(Continued from Page 4)*

If these competitors have to lower prices for their products, their reduced profit margins could cut the investment dollars available for the development of new market areas such as office automation, one analyst speculated.

Although most mainframers declined to comment on the Justice Department's move, Burroughs Corp.'s Chairman and Chief Executive Officer W. Michael Blumenthal said in a prepared statement that his firm "has declined involvement in litigation such as the IBM dispute from the outset and has long felt the marketplace is where the decision should be made."

As for prices, spokesmen for both Prime Computer, Inc. and NAS noted that IBM has been highly aggressive in pricing despite the antitrust suit. IBM has six product lines that compete with mini makers and in the last 18 months has introduced aggressive pricing for those lines. There is not much more IBM can do on that front unless the firm is willing to accept lower profit margins, Karl Wassman, assistant treasurer at Prime, maintained.

Agreeing with Wassman, NAS' Martin pointed out that in the past 36 months IBM's price/performance ratio has been very aggressive. IBM can take only so much "self-inflicted pain," he added.

### Other Moves

Besides outright pricing, other moves IBM is expected to take include adding more products to its volume purchase agreement roster and widening the scope of its special bid organization, observed Gerard Hallaren, an analyst with the Yankee Group in Boston.

Rather than hassling hardware vendors, Martin sees IBM going after new business areas such as specialized on-line computer service bureau applications. And besides service bureau activities, IBM will now more openly pursue other new market opportunities such as robotics and merchant semiconductors, Hallaren offered.

With its pursuit of the medical instrumentation market, IBM has already demonstrated its interest in such growth businesses, he maintained.

Hallaren would not be surprised to see IBM acquire companies with peripheral products geared to the small business market such as floppy disks and small printers, he added.

Whatever the market outcome, Data General Corp. commended the final disposition of the IBM suit. Reflecting the view of DG President Edson D. de Castro, a spokesman for the firm pointed to the adverse relationship that has existed between industry and the government in the U.S., contrasting this environment with the cooperative attitude between the Japanese government and the computer industry. DG said that it hopes the decision of the Justice Department signals a new era in the U.S. where the government will help rather than hinder the interest of industry.

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# Justice Department Decides to Drop IBM Case

CW Photo

**Judge David N. Edelstein**

UPI Photo

**Thomas D. Barr**

*(Continued from Page 1)*

In January 1972 during the Nixon administration, Edelstein, the chief judge of the district court, decided to preside over the trial as its sole arbiter. Pretrial procedures commenced, creating nearly 5,500 pages of transcript.

The nonjury trial formally opened on May 19, 1975. Besides being lengthy, it was plagued with delays and other problems as attempts were made to define the computer market. It was also interrupted by IBM's unsuccessful attempt to have Edelstein removed from the trial on the grounds that he was biased.

The trial lasted nearly six years. It formally ended on June 1, 1981, when the government rested its case. At that point, Barr asked Baxter to reopen settlement negotiations.

On June 18, Baxter appeared in the courtroom for a meeting in which he said he would review the case. Edelstein delayed the post-trial proceedings in the hopes of a settlement.

At the Jan. 18 hearing here in which the government announced it was dropping the case, Barr — the only person left besides Edelstein who had been at the trial since its inception — told the court that the dismissal was complete except for a few "housekeeping terms," which he later said amounted to mostly the transferal of paper.

"There's one thing to say today that is most important," Barr said. "On the day this case was filed, IBM stated that this case was without merit and would be defended vigorously. This case led to the filing of many private cases — 16 federal judges have decided in our favor. Today, the Antitrust Division has concluded what IBM said 13 years ago and what every judge has found true — the Department of Justice agrees these claims are without merit. IBM has been completely vindicated."

### Edelstein Ruffled

Edelstein stated that the court has no say in a case when both parties agree on a dismissal, but he was believed to be annoyed at the way the stipulation was handled. He was also ruffled because Baxter was not in attendance at the hearing but sent his deputy, Abbott Lipsky, in his place.

When asked why Baxter was not in attendance, Lipsky said that the antitrust chief was attending a matter of "paramount importance." Edelstein was not satisfied and said, "I think this court is entitled to a more specific reason why Mr. Baxter can't be here."

In fact, Baxter had remained in Washington for the announcement of the settlement of the U.S. vs. AT&T antitrust suit, but Lipsky was legally bound not to tell that to Edelstein.

Edelstein also made a point of commenting on the record regarding what he called the "dramatic" reference to the antiquity of the 13-year-old case. He stressed that the actual trial did not begin until 1975.

In a prepared statement, John R. Opel, IBM's president and chief executive officer, called the dismissal "wonderful news" and said that he and Frank Cary, chairman of IBM, were grateful to Baxter for studying the case and for having the integrity to withdraw it on the merits. "Our industry is healthy and competitive and IBM has not violated the antitrust laws," Opel said.

## *Common Market to Pursue Suit*

BRUSSELS — IBM may have settled its differences with the U.S. government, but the Common Market still plans to continue its antitrust investigation against the computer giant.

In November, IBM was denied a petition in which it asked the European Court to drop its inquiry into whether IBM abused its position as the dominant supplier in Europe.

In light of the U.S. Justice Department's dismissal of the U.S. vs. IBM antitrust suit,. a Common Market spokesman reemphasized its intent to complete the investigation. "The case continues. Nothing changes for us," he said.

If the Common Market decides IBM did engage in monopolistic practices, it can impose a fine.

# Baxter Explains Why U.S. vs. IBM Dismissed

*(Continued from Page 1)*

a four-month period and holding numerous meetings with the government's trial staff and IBM attorneys, Baxter said he concluded that the evidence did not support the charges against IBM and that it was "extremely unlikely" that the government would win the case.

Even if it did win, the decision would probably be reversed on appeal, Baxter said. At a cost to the government of between $1 million and $2 million per year and with the likelihood that appeals would drag the case out for at least seven or eight more years, dropping the case was the only sensible course of action, he said.

Although he said there were some "episodes" of IBM conduct during the years covered in the suit that could be considered of questionable legality, Baxter maintained the government could not prove they contributed to IBM's dominance of the general-purpose computer market.

As an example, Baxter noted the controversy surrounding IBM's marketing of its 360/90 scientific processor. This was the "most convincing episode" of illegal behavior, but it did not relate to the company's activities in the general-purpose computing field and had already led to a "substantial payment" to Control Data Corp. in an earlier settlement.

Once he concluded that the government's evidence was "extremely tenuous" and "flimsy," Baxter said, it would have been "improper" to try to persuade the court to reach a decision the government did not itself believe was warranted.

Therefore, the "only responsible course open to the government was to drop the case," Baxter told Attorney General William French Smith in a five-page memorandum explaining the decision to drop the suit.

### Baxter's Decision

Neither Smith nor his deputy, Edward C. Schmults, participated in the consideration of the IBM suit because they had dealt with the firm before taking office. This left the decision entirely to Baxter, who said he kept the White House informed of his actions through consultations with the President's chief adviser, Edwin Meese, and Fred Fielding, counsel to the President.

"I am thoroughly convinced that I have considered all available courses of action, and that I have heard the most compelling arguments for and against each," Baxter said. The memo detailed the three most "prominent" reasons for ending the suit:

- "It may well be that IBM is a monopolist and controls some segment of the computer market," Baxter told Smith. But, he added, "the government's case does not allege that IBM achieved that position illegally. Rather, the complaint alleges that IBM maintained a monopoly position lawfully achieved through a series of illegal actions against its competitors."

Baxter said he concluded from the record of IBM's actions that "while several may have occurred in the manner and with the intent alleged, the most persuasive episodes concern computer systems that are not included within the market IBM is alleged to have monopolized."

He also noted that complaints of IBM actions against manufacturers of compatible peripheral equipment had led to individual suits by several of those manufacturers and that "all of them lost either at trial or at the appellate level."

- Even if the government prevailed at the trial, "the likelihood of success on appeal is small," Baxter said. IBM would certainly appeal an adverse decision, he noted, telling the press conference that past decisions by the relevant appeals court were "ominous" for the government's chances of sustaining a lower court victory.
- "Finally," he told Smith, "even assuming that the government could prove IBM's liability, there is no assurance that appropriate relief could be obtained." He dismissed the possibility of injunctions, restructuring IBM or fining the company.

"It is impossible to fashion injunctions to prevent similar future violations that are neither so specific that they would be meaningless ... nor so general that they would simply echo the language of existing antitrust laws." On the other hand, "structural relief in this case would be totally disproportionate to the nature and the scope of the violations that we might be able to prove."

Fines and jail sentences for IBM officers and employees would be appropriate if the government could prove its case, he added, but the government precluded that possibility by electing in 1969 to pursue a civil rather than criminal case.

Baxter also said that he decided not to seek a settlement agreement with IBM because the company was unwilling to discuss anything other than "token" and "cosmetic" measures, which "would not have been in the best interest of the public.

"In sum, the government is not likely to win this case. Even if it did, there is no relief I could recommend in good conscience," he said.

Baxter acknowledged at the press conference — held at the same time the government attorneys asked presiding Judge David N. Edlestein in New York to drop the case — that members of his trial staff did not necessarily agree with his decision. But he said they had been "psychologically conditioned" by their daily association with the case to believe it was justified and could be won.

## *Calls Suit Dismissal 'Gross Mistake'*

# Economist Sees 'Wide Open Door' to Monopolies

**By Tim Scannell**
CW Staff

ITHACA, N.Y. — The Reagan administration's recent decision to drop the 13-year-old IBM antitrust case may have freed the government from the financial burden of continued prosection, but it has created a "wide open door" to future monopoly in the computer industry.

That is the opinion of the economist who served as the government's chief economic witness and consultant during the U.S. vs. IBM antitrust case.

"I think it is a gross mistake," Dr. Alan McAdams, an economist at Cornell University, said of the Justice Department's decision to drop the lengthy and often confusing litigation during which the computer giant battled charges of unethical and monopolistic activities in the general-purpose computer market. "The conduct carried out by IBM and AT&T are quite parallel . . . but they were dealt with in opposite ways. What AT&T is accused of doing, IBM has done."

### U.S. vs. AT&T

On the same day the Justice Department announced it was dropping U.S. vs. IBM, AT&T and the Justice Department reached an agreement to settle the U.S. vs. AT&T antitrust suit. The agreement calls for AT&T to divest itself of its $80 billion Bell operating telephone companies, said to represent about two-thirds of the communications giant's assets.

McAdams, who contributed heavily to the IBM antitrust trial as a government witness and was considered the Justice Department's guiding theorist in the case, claims that the recent decision represents a major change in antitrust policy — a change that could promote future antitrust activities among large computer vendors.

Citing a memorandum issued by U.S. Assistant Attorney General William F. Baxter following the government's Jan. 8 announcement that it had decided to dismiss the case, McAdams maintained that the Justice Department recognized that IBM is a monopolist, that it used monopoly powers to deter other companies from entering the computer market and that it actually targeted some companies for destruction. However, the memo implied that the government basically found nothing wrong with IBM's practices, McAdams stated.

In his memorandum, Baxter concluded that while IBM may be responsible for several "bad acts" and through these acts may have attempted to make some of its competitors "dying companies," it should not be deemed guilty just because it is big and successful.

Now, "short of dynamiting a company's building and shooting the managers, it's going to be kind of hard to find a violation," he observed.

Although the Justice Department dismissed the IBM case as being without merit, the Baxter memorandum points to a number of instances in which IBM used its monopolistic power to damage its competitors. For example, the memorandum states that IBM deliberately underpriced its 360/90 scientific processor to undercut Control Data Corp. and prevent it from entering the general-purpose computer market.

McAdams contended that since IBM was losing money through its underpricing tactics — to the tune of about $100 million — it had to get money from some other operation, specifically, another of its computer divisions.

"They had to get their profits from somewhere else," McAdams said. "And they did."

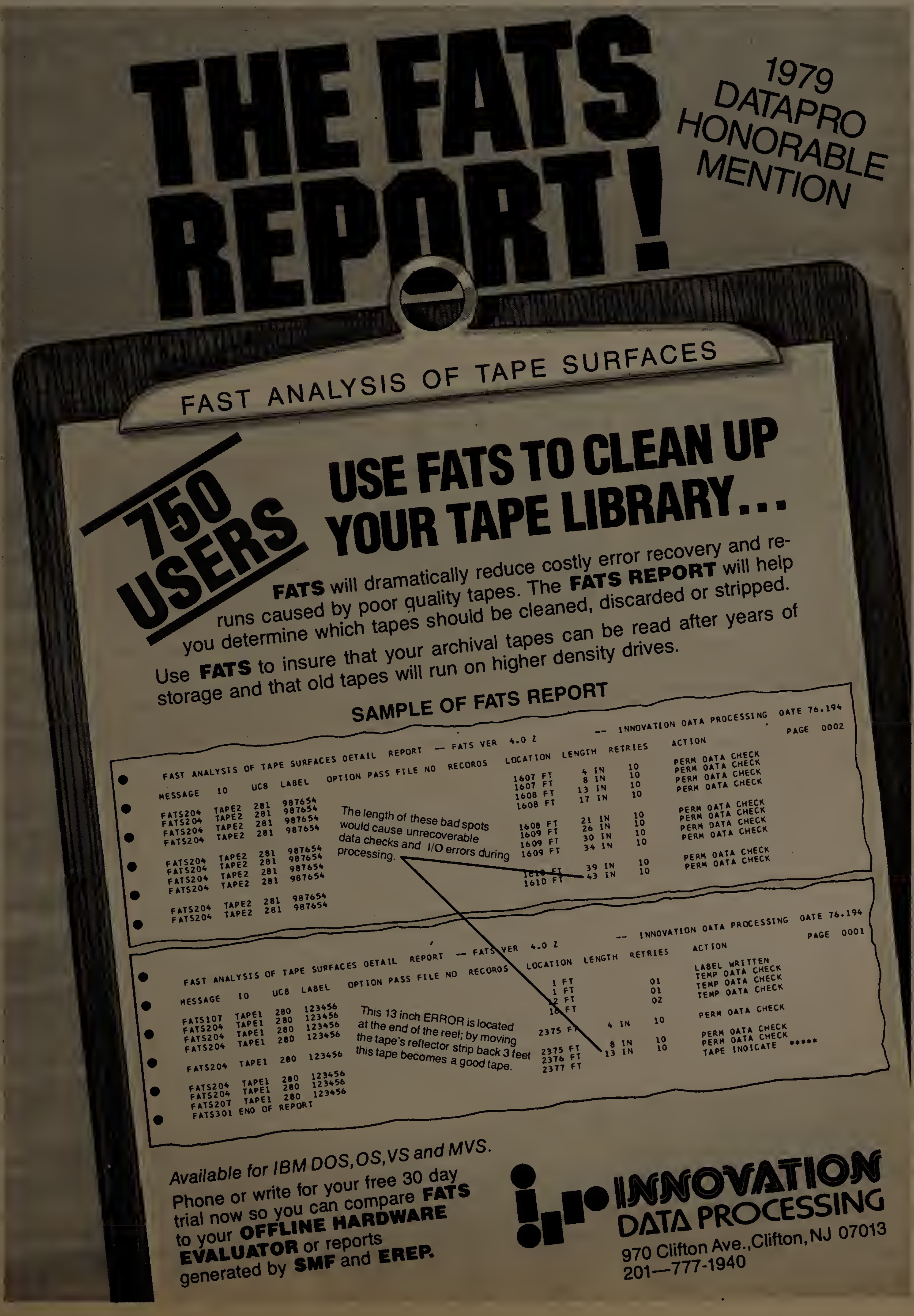
(IBM eventually paid CDC $101 million as settlement in a suit that contended IBM engaged in unethical pricing activities, McAdams stated.)

IBM's actions involve "exactly the same kind of cross-subsidization that [Baxter] strongly objected to in the AT&T case," he continued. "It is puzzling why that kind of action by IBM is used as a mitigating reason . . . and somehow makes its pricing below cost not significant."

The fact that AT&T competes in a regulated industry and IBM does not may have had an overriding influence on Baxter's decisions. "There must be something about regulation, providing a taint of some kind, which makes the AT&T action bad and the IBM action OK," McAdams said.

In defending the Justice Department's decision to dismiss the IBM suit, Baxter explained in his memorandum that "the most persuasive episode [of IBM antitrust actions] concerns systems which are not included within the market IBM is alleged to monopolize." While McAdams agrees with this statement, he asserted that IBM's intention was to prevent these firms from fully establishing themselves and entering into general-purpose computing.

In defending his decision, Baxter also noted that even if the government continued with the trial, the likelihood of success was slim.



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# *Industry's First Concern: Local Transmission*

**By Marcia Blumenthal**
CW Staff

The most immediate concern raised by the settlement agreement between AT&T and the Justice Department is the potential impact on local data transmission after divestiture of the 22 Bell system operating companies, industry observers said last week.

Speculation about the eventual clash of the titans — AT&T and IBM — in segments of the information processing marketplace was also a favorite topic for analysts and competitors.

"Inevitably, the industry will now have two giants," observed John C. Hart, director of technology services for International Data Corp. (IDC), the Framingham, Mass., market research firm. Hart sees IBM and AT&T on a collision course, particularly in the areas of private automated branch exchange (PABX) equipment, satellite transmission, computer services and even general-purpose processors.

In the shorter term, the prospect of having to deal with 22 independent telephone operating companies in order to transmit data locally will propel vendors to develop communications links that avoid using local telephone company lines, according to Page Montgomery, vice-president of Economics and Technology, Inc.

One of those companies, Tymnet, Inc., which is currently about 99% dependent on telephone company lines for the local transmission of data, has already started that process, noted Arthur Caisse, vice-president of product planning.

About 18 months ago Tymnet became involved in a local data transmission experiment using cellular radio technology. The experiment is with LDC, a partnership between Satellite Business Systems, Aetna Insurance Co. and M/A-Com, Inc. [CW April 14, 1980].

Since then, Tymnet has applied to the Federal Communications Commission to become an extended carrier, thus enlarging the scope of that experiment by supplying local data transmission services to 50 cities, Caisse reported.

By reducing local data transmission costs by avoiding the use of telephone company lines, vendors may be able to provide data networks at lower rates, noted Karl Wassman, assistant treasurer at Prime Computer, Inc. This will increase the number of network applications available and ultimately benefit users, he predicted.

Moreover, the possibility of increased local data transmission costs when utilizing telephone company lines could spur the adoption of newer technologies such as fiber optics and cable television.

Yet, as a result of the settlement, local telephone companies may not have sufficient incentive to upgrade local loops, noted Chris Mines, an analyst with the Yankee Group in Boston.

Users will now have to be a lot smarter about local networks because the solution is no longer "go to Bell," he added.

Another possibility mentioned by some industry observers involved AT&T producing black boxes, but being selective about the markets it chooses to enter. "A minicomputer that runs Unix better than a Digital Equipment Corp. system is a natural for AT&T to sell," Mines said. AT&T will offer "a full A-to-Z product line" for the data communications market, he predicted.

Most industry analysts agreed that it will take at least two years to discern AT&T's strategy, but IDC's Hart cautioned vendors not to underestimate AT&T's ability to get into the computer industry quickly.

# Settlement Modifies 1956 Consent Decree

*(Continued from Page 1)*

vices on an unregulated basis, the settlement agreement contains the following key provisions:

- AT&T will undertake an 18-month reorganization after which local Bell operating companies providing local exchange telephone service will be divested by AT&T.
- Bell will continue to own the nationwide long-distance telephone network; its Long Lines Division will remain a part of the parent company. In addition, AT&T will acquire the intercity facilities of the operating companies.
- AT&T also will retain ownership of its research arm, Bell Telephone Laboratories; its equipment manufacturing arm, Western Electric Co.; and Teletype Corp. It will also take over the marketing of terminal equipment — a chore now assigned to the operating companies.

The reorganization plan implementing these changes must be submitted to the Justice Department for its approval within six months after the agreement becomes effective.

The modified consent decree also requires the to-be-divested operating companies to provide exchange access to all intercity carriers equal to that provided to AT&T on a phased-in basis. It forbids the operating companies from discriminating against AT&T's competitors with respect to procurement, interconnection of equipment or services, the establishment and disclosure of technical specifications and the planning of new facilities and services.

The divestiture must "permit the [Bell operating companies] to perform independently of AT&T, exchange telecommunications and exchange access functions." Separate sets of accounts must be maintained for these two activities.

Until Sept. 1, 1987, AT&T, Western Electric and Bell Labs are required to provide the operating companies with research, development, manufacturing and other services "to enable the [Bell operating companies] to fulfill the requirements of this Modification of Final Judgment."

Upon filing the proposed modification in the U.S. District Court in Newark, N.J., which has jurisdiction over the 1956 Consent Decree, the government and AT&T moved to have jurisdiction transferred to Greene. The government and AT&T asked Greene to dismiss the suit "because the modification of the decree achieves the purposes" of the suit.

In addition, the government has withdrawn its challenge of the Federal Communications Commission's Second Computer Inquiry Decision. Essentially, that decision allows AT&T to offer on-line information services on an unregulated basis. The AT&T/Justice Department agreement would do likewise, subject to the conditions mentioned above.

An elaborate procedure is established to assure that the provisions of the settlement are carried out. Each management employee of the Bell operating companies, for example, must sign a statement acknowledging receipt of the agreement and awareness of the penalties for noncompliance. In addition, the Justice Department is granted "visitorial rights" with permission for a department representative to interview any employee or officer of an operating company and inspect all of the company's records and files.

# N.Y., N.J. Plan Municipal Satellite Station

**By Bob Johnson**
CW New York Bureau

NEW YORK — A municipal satellite telecommunications station with an adjoining industrial complex suited for DP installations is scheduled to be built on the west shore of Staten Island, N.Y., next year.

The project is a joint venture between New York City's Public Development Corp. (PDC) and the Port Authority of New York/New Jersey. Plans are underway for a 777-acre complex containing a "teleport" to serve as a communications link for DPers, cable TV operators, broadcasters and others requiring communications facilities.

According to the port authority's teleport project manager, Bob Catlin, the project will undertake the building of 10 and possibly as many as 20 transmitting and receiving antennae or "dishes." The dishes will hook up to a variety of satellites from such companies as Comsat General Corp., Hughes Aircraft Co. and RCA Global Communications, Inc., Catlin said. Information received will be piped along port authority right-of-way via fiber optic cable to a central hookup at the World Trade Center in lower Manhattan for use by various users.

## Vendor Discussions

The entire industrial park is slated to cost more than $50 million, half of that going for hardware costs. Although no communications vendor has yet been selected to undertake the project, the port authority is talking to some firms that are "household names." Discussions with computer hardware vendors are also underway, the port authority added.

According to Catlin, the park will have about 600,000 square feet of available space suitable for an estimated 17 DP tenants. The facilities will be one- and two-story buildings secured by port authority police. A backup diesel generator is also planned in the event of a major area power failure. "I have spoken to a number of prospective users — mostly from the financial community — who have expressd a desire to move their data centers. Many of them will offer the right type of environment, considering the DPers concern for security and power supply," Catlin said.

When asked how the teleport project was conceived, Catlin explained that the port authority realized that there is a current congestion of radio frequency transmissions and that it foresees an immigration of broadband communications users into the New York area. "The teleport will be an alternative to moving communications out of New York," he said.

During a recent interview, Philip Aarons, president of PDC, said the teleport project will supply Staten Island with nearly 3,000 jobs and will help New York to get an edge on the "information boom."

# Deltak Adds Two Course Series

OAK BROOK, Ill. — "Strategies for Hardware and Software Acquisition" and "Technical Writing" are two new series of courses now offered through the Deltak, Inc.'s Deltavision Library Plan.

The first series consists of five courses, which can be given on an individual or group basis. The courses were designed for users involved in acquisition — especially management information systems (MIS) managers — in need of an acquisition methodology.

The series lasts between three and six hours, using a short text for review after videotape presentations. The first in the series is "General Methodology for Hardware and Software Acquisitions," which covers such topics as selecting acquisition team members, organizing the acquisition effort and other aspects of the MIS environment affecting acquistion. The final course on "Computer Contracts and Financial Alternatives" covers financing and other details, which should be considered in the vendor contract.

The technical writing series is designed for DP professionals at all levels and technical people in science, engineering, manufacturing, finance and accounting. The three courses in this series are designed to improve basic writing skills and techniques of technical composition. Each course lasts four to five hours.

The courses in each series are available for $50/mo to $125/mo each, depending on the size of the rental or purchase package. More information is available from Deltak, 1220 Kensington Road, Oak Brook, Ill. 60521.

## *Wirth: 'Legislation Imperative'*

# AT&T Pact Sparks Congressional Concern

**By Jake Kirchner**
CW Washington Bureau

WASHINGTON, D.C. — Settlement of the AT&T antitrust suit makes new communications legislation more important than ever, House of Representatives Communications Subcommittee Chairman Rep. Tim E. Wirth (D-Colo.) said last week.

And in the Senate, Commerce Committee Chairman Sen. Bob Packwood (R-Ore.), whose own bill rewriting the Communications Act of 1934 was passed last October, said that the settlement raises "legitimate reasons for concern."

In a statement issued Jan. 8, the day the settlement was announced, Packwood said that "if adequate [consumer] protections are not contained in this agreement, I, for one, will take the leadership in Congress to enact legislation to accomplish that objective."

Despite Justice Department assertions that the agreement ending the seven-year-old suit removes the need to rewrite existing communications law, Wirth maintained that "legislation is absolutely imperative . . . The urgent need for legislation has been increased with the agreement."

The Colorado Democrat also announced that AT&T Chairman Charles Brown will appear before the House subcommittee next Wednesday to discuss details of the company's agreement with the Justice Department.

Wirth said that his recently introduced Telecommunications Act of 1981 will need some redrafting to reflect industry changes brought about by the settlement. But overall, the chairman said, the settlement only highlights "in stark relief" important issues already addressed in the bill.

Wirth said Wednesday that after studying the terms of the antitrust settlement, he concluded that the agreement "is absolutely workable if supplemented with strong legislation." But, he added, there are "significant issues" not resolved by the agreement.

### Continuing Problems

Besides the possibility that local telephone rates might increase substantially when AT&T divests itself of its local operating companies, Wirth mentioned the continuing problems of assuring that AT&T's long-distance services monopoly does not subsidize the company's future activities in unregulated markets.

In addition, he said, legislation is needed to ensure that AT&T does not use its size and power to monopolize any information services it might offer after the divestiture. Also unresolved by the agreement, he said, are issues of maintaining a unified telecommunications network vital to national security, international trade issues, questions of Federal Communications Commission's regulation in the new industry environment and equipment depreciation and deregulation schedules.

While the agreement "clearly reduces existing concerns about monopoly ratepayer subsidization of AT&T's competitive activities," Wirth said, it "fails to address the long list of other problems and raises some new questions as well.

"It is clear," he said, "that the agreement does not obviate the need for legislation. Indeed, the agreement makes the early passage of legislation critical."

By raising national awareness of these issues, the settlement could facilitate passage of legislation, according to Wirth. He also suggested his late summer target for passing a House bill could be accelerated by the agreement.

CW Photo

**Rep. Tim E. Wirth**

# Adapso Begins Grant Program

ARLINGTON, Va. — The Association of Data Processing Service Organizations (Adapso), Inc. has announced the establishment of a grant/fellowship program to assist and encourage postsecondary students who are planning careers in the computer services industry.

Adapso will be awarding up to 40 grants and fellowships to deserving students nationwide for the 1982-83 academic year, a spokesman for the group reported. Awards will be up to $1,000 per recipient per academic year.

The criteria for selection will be the applicant's academic credentials, test scores, class standing, data processing projects and references, including extracurricular activities, association membership(s), leadership positions held and financial need, according to Adapso.

The applicant also must indicate a clear intention to pursue a career upon graduation in the computer services industry.

The successful candidates must be full-time students or have been accepted at an Adapso-approved postsecondary school and academic program.

The application deadline is April 30 for awards to be given for the 1982-83 academic year. More information about the Grants Fellowship Program is available from Adapso at Suite 300, 1300 N. 17th St., Arlington, Va. 22209.

# Judge Snags Settlement of U.S. vs. AT&T

*(Continued from Page 1)*

thority to proceed as if the act did apply.

The conflict between Greene and the trial staffs arose because on Jan. 8, the day the settlement was announced, the agreement was taken before the New Jersey federal court that has jurisdiction over the 1956 decree.

The Justice Department and AT&T asked Judge Vincent P. Biunno of that court to turn the decree over to Greene for final modification when he disposed of the antitrust suit according to Tunney Act procedures.

### Surprise Move

In a surprise move on Jan. 11, however, Biunno approved the settlement on his own and modified the consent decree according to the settlement terms, effectively denying Greene any authority to oversee the modification of the 1956 agreement. AT&T and Justice said Greene had no choice then but to dismiss the case and expressed confidence that some way would be worked out to allow public participation in the final structuring of the settlement terms.

Greene told Justice Department attorney Gerald Connell Tuesday there would have been no problem if the two parties had not rushed to file the agreement in New Jersey. He accused them of trying "to circumvent" the law and escape his scrutiny of the settlement agreement.

Connell protested that the department intends to proceed "entirely in the spirit of the Tunney Act" and said, "We don't intend for the public to be deprived of the kind of hearing contemplated in the Tunney Act."

Lead AT&T attorney George Saunders also assured the court the company "absolutely" is committed to the Tunney Act proceedings. But he said he could not deny "this court has no power" to insist on those proceedings.

"This case is history," Saunders said.

Greene praised both trial staffs and applauded their agreement, saying it is good for both sides "to have a hand in their own destiny." Nonetheless, he continued, the public interest must be protected.

Greene gave the attorneys until today to arrange either to have authority over the consent decree transferred to his court by Judge Biunno or to arrive at some other legal procedure for applying the Tunney Act to the settlement.

If not, Greene said, he would determine whether he could on his own initiative "judicially mandate" that the Tunney Act be invoked. "This court must make certain the Tunney Act is applied," he said, adding "I intend to do just that."

Greene explained he is fully prepared to order a resumption of the trial if no way is found to resolve the problem. AT&T and Justice attorneys, for their part, claimed the case is over and said they were confident procedures for public comment and court review of the settlement would be worked out to Greene's satisfaction.

## *Bell 'a Withering Corporation' Under Consent Decree, Attorney Says*

WASHINGTON, D.C. — AT&T would be "a withering corporation waiting for its demise" if it were forced to continue living with the 1956 Consent Decree, its lead attorney in the U.S. vs. AT&T antitrust case said here last week.

Speaking with reporters after a hearing in which Federal Judge Harold H. Green said he would not dismiss the case until Tunney Act procedures had been followed (story on Page 1), attorney George Saunders told reporters that the case ended when the two sides agreed to the settlement and claimed that all that remained were minor details to ensure that the public interest is protected in the agreement.

Calling the dispute with Greene "a tempest in a teapot," the attorney said AT&T and the Justice Department will "find some way to unravel this."

Saunders told Greene the matter had been put before the New Jersey court because modification of the 1956 Consent Decree was the heart of the settlement. "The biggest concern of the telephone company was the consent decree," he said. "We cannot live with that decree." Unless the firm can get out from under the decree, "we are a withering corporation waiting for its demise," he said.

Even if the company could avoid divestiture, as sought in the government's suit, expected federal and state regulations on the phone company would be so onerous they would prohibit Bell from effectively competing in the future, Saunders said. The company could no longer operate with the regulatory and judicial uncertainty it faced and within the restraints of the consent decree, according to Saunders.

# *Deputy CIA Director Wants DP Research Reviewed*

**By Jake Kirchner**
CW Washington Bureau

WASHINGTON, D.C. — Results of advanced research in computer hardware, software and other areas of electronics should be subject to U.S. intelligence agencies' review in order to restrict Soviet access to technology critical to national security, Deputy Central Intelligence Agency Director Adm. Bobby R. Inman said recently.

Unless researchers submit to a voluntary review system, they may be faced with more stringent, legislated measures, Inman told the annual meeting here of the American Association for the Advancement of Science (AAAS) earlier this month.

Inman noted the National Security Agency (NSA) last year developed a voluntary review process for cryptographic research with the private sector. The process was initiated by Inman when he was head of NSA.

That process consists of submitting research findings to the Public Cryptography Study Group, formed by the American Council on Education and representing NSA and the U.S. scientific and academic communities. The committee's recommendations are advisory, and researchers are free to publish their work as they see fit.

"There are, in addition, other fields where publication of certain technical information could affect the national security in a harmful way," Inman told the AAAS. Examples include "computer hardware and software, other electronic gear and techniques, lasers, crop projections and manufacturing procedures," he said.

## Opinion Backlash

Inman warned of a backlash of public and congressional opinion against the free access of foreign governments to U.S. technical knowledge. This could result in a wave of restrictive measures imposed on scientists, he said, claiming much of the Soviet military technology is already based on U.S. research.

Reaction to Inman's remarks among scientific and DP professional organizations has been generally negative, although representatives of several such groups contacted last week pointed out that Inman was not specific about how this voluntary censorship should be handled. They uniformly suggested that while technology diversion to the Soviet Union is a recognized problem, such censorship could have a chilling effect on the U.S. scientific community and hurt the U.S. more than the Soviet Union.

But, according to Inman, "scientists' blanket claims of scientific freedoms are somewhat disingenuous in light of the arrangements that academicians routinely make with private corporate sources of funding." National security concerns should be above "corporate, commercial interests."

Moreover, Inman told the association meeting, "much of the stimulating effort for computer science in this country came from government sponsored and controlled classified activity." He maintained that "science and national security have a symbiotic relationship — each benefitting from the interests, concerns and contributions of the other.

"In light of the long history of that relationship, the suggestion is hollow that science might be — or should be — kept apart from national security concerns or that national security concerns should not have an impact on 'scientific freedom,' " He said.

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# Settlement Turns Bell Into Information Firm

Analysis

*(Continued from Page 1)*

though AT&T is required by the settlement to spin off the 22 operating companies, its ties to those subsidiaries will be close and continuing. One provision states that AT&T will transfer to the operating companies "sufficient facilities, personnel, systems and rights to technical information to permit the [Bell operating companies] to perform independently of AT&T, exchange telecommunications and exchange access functions."

Another provision allows "sharing, through leasing or otherwise, of multifunction [local and long-distance] facilities." In addition:

- The divested subsidiaries can be consolidated into as many or as few companies as they choose.
- "Notwithstanding operation of ownership, the [Bell operating companies] may support and share . . . a centralized organization for the provision of engineering, administrative and other services which can most efficiently be provided on a centralized basis."
- "Until Sept. 1, 1987, AT&T, Western Electric and the Bell Laboratories shall, upon order of any [Bell operating company], provide on a priority basis all research, development, manufacturing and other support services to enable the [operating company] to fulfill the requirements of this modification of final judgment."

These provisions could blunt other parts of the agreement and erode much of what the Justice Department believes it gained from settling with AT&T out of court. For example, the divested operating companies cannot "discriminate between AT&T and its affiliates and their products and services, and other persons and their products and services." However, if all 22 Bell operating companies coalesce into a single company, which then places consolidated orders for modems, telephone sets, central office switches, multiplexers and related gear, no company other than Western Electric probably would have the production facilities needed to fill the orders.

The services that can "most efficiently be provided on a centralized basis" are nowhere defined. Nor is anything said directly about participation of AT&T's Long Lines Division, which remains a regulated part of the parent company.

Since one purpose of this centralized organization is to "provide a single point of contact for coordination of [Bell operating companies] to meet the requirements of national security and emergency preparedness," however, the participation of Long Lines would seem to be mandatory.

All of these items suggest that the centralized organization could be a pipeline between the two independent parts of what is today the Bell system — a pipeline through which technical and service information could pass freely prior to the time it became generally available.

The agreement specifically bars such exchanges, but it is difficult to see how the "requirements of national security and emergency preparedness" could be met without trading such information. It is also difficult to see how enforceable limits on exchanges could be established.

The biggest question raised by the settlement undoubtedly concerns AT&T's unregulated services. At the end of 1981, a consensus was emerging in Congress on the need for certain constraints on those services. Notably, S. 898, the Communications Act rewrite bill passed by the Senate in July, would require AT&T to offer videotex and other "electronic publishing" services through a dedicated, separate subsidiary. Similar language was incorporated into H.R. 5158, the proposed House of Representatives rewrite bill.

Nothing is said in the AT&T/Justice Department settlement, however, about Bell's unregulated services or about the relationship between the entity that provides these services and AT&T's Long Lines Division. Thus, electronic publishing could be provided by the same entity that provides other on-line services.

In addition, the unregulated services' provider could lease circuits at below-market prices from Long Lines, buy terminals from Western Electric on equally favorable terms and offer the end user an on-line information package for less than any competitor.

The settlement agreement does not require the Long Lines Division to provide competitors with service equivalent to what is provided to AT&T's unregulated service affiliate. Nor is AT&T barred from establishing an alternate, unregulated local loop system that could connect data communications users end-to-end. The company is free to use a proprietary protocol on this network, to keep its technical parameters secret, to change the parameters at any time and to bar the use of "foreign attachments" — all of which could put many data communications users and suppliers under the same sort of handicaps they faced before the Federal Communications Commission's (FCC) 1968 Carterfone Decision.

## Future DTS

Digital termination systems (DTS) are one obvious implementation of the alternate local loop idea. Although Bell has not yet announced any DTS capability per se, the company is busily testing a cellular mobile radio system in Chicago and has announced plans to begin offering a commercial service next year based on this technology.

According to Walter Hinchman, former chief of the FCC's Common Carrier Bureau and now a private consultant, the AT&T system could support local loop data transmission at speeds up to 10K bit/sec.

Concern about possible flaws in the settlement agreement is already beginning to be voiced by key movers and shakers in Washington. The most clear-cut example is Rep. Tim Wirth's (D-Colo.) statement shortly after the settlement was announced. Wirth, chairman of the House subcommittee that drafted H.R. 5158, said "it appears the agreement fails to take account of the possibilities of cross-subsidizing by the remaining parts of AT&T, making it possible for the company to behave anticompetitively."

## Uphill Battle

Wirth and his fellow-believers appear to face an uphill battle, however, in attempting to remedy the settlement's alleged defects through legislation.

Shortly after announcing the settlement, Assistant Attorney General William Baxter said it "cleanly eliminates" the cross-subsidy problem that was the focus of "the great bulk" of pending telecommunications legislation.

AT&T almost certainly will actively oppose legislation, since its only effect would be to reduce the benefits gained from the settlement.

Meanwhile, the specialized carriers — who have been in the forefront of those attacking AT&T in the courts, at the FCC and on Capitol Hill — appear likely to be content with what they have gained: divestiture of the operating companies and a guarantee of equal access to AT&T local exchange networks.

"We think the settlement is wonderful," said one specialized carrier spokesman, adding, "We got all we asked for and ended up with more than we expected."

There is an alternative to legislation, however, which may be the focus of activity in coming months. It involves attempting to modify the settlement agreement worked out between AT&T and the Justice Department.

## *Need for Legislation Seen*

# Reactions to Settlement Show Debate Not Over

**By Phil Hirsch**
CW Washington Bureau

ATLANTA — Although AT&T and the Justice Department appear to have settled their differences, the great debate over national telecommunications policies is far from over.

That became clear here last week at the Communication Networks '82 (Comnet '82) conference when representatives of some of the major interested parties exchanged views.

Much of the discussion centered on the need for new legislation. Thomas R. Phillips, AT&T's assistant vice-president for public affairs, suggested that there is relatively little left for Congress to do since much of the language in the recently negotiated settlement agreement is identical or similar to S. 898, the bill passed by the Senate last year to replace the Communications Act of 1934.

However, Phillip Verveer, a lawyer who helped prosecute the Justice Department's suit and who also headed the Federal Communications Commission's (FCC) Common Carrier Bureau, presented a list of a dozen concerns that he thought Congress should address. These included such areas as the relationship between AT&T's Long Lines Division and the new services/terminal equipment subsidiary or subsidiaries, how much local rates should be subsidized to encourage universal service, how the subsidy should be distributed among users and whether AT&T should be encouraged to offer high-speed digital local loops.

One of those involved in the legislative drafting process — David Allward, staff director of the House of Representatives' Telecommunications Subcommittee — agreed that a number of issues remain to be resolved by Congress in the wake of the settlement. But he believes the settlement makes the task easier, rather than more difficult, because divestiture of the Bell operating companies has reduced the number of issues that must be addressed.

Ward White, senior counsel of the Senate Commerce Committee, characterized S. 898 as "basically sound" and pointed out that any changes can be made in conference with the House of Representatives.

### Private Lines

The likelihood of deregulating private line services, whether AT&T is now free to offer electronic publishing service and the need for Congress to dictate the information dissemination policies of AT&T's Long Lines Division were the other major topics touched on by Comnet attendees.

The private line discussion was precipitated by a question from Bob Bennis, telecommunications director at Westinghouse Corp., who wanted to know whether AT&T would provide equal access to private networks since the settlement with the Justice Department requires only that the operating companies must provide equal access to long-distance carriers. Phillips said he did not know.

Much of the discourse, however, revolved around a statement made by Assistant Attorney General William Baxter at the Jan. 8 press conference announcing the settlement. At that time, Baxter expressed the hope that AT&T's long-distance services would remain regulated "for only a short period."

At the conference, this issue was discussed in terms of whether Bell's long-distance facilities present a bottleneck analagous to the one created by the phone company's historic control of local-exchange facilities.

White thought the potential long lines tie-up was different and could be safely controlled through legislation — an implication that continued regulation is not necessary.

Allward pointed out that AT&T controls well over 90% of the nation's long-distance communications plants. He believes that until that percentage drops significantly, regulation will be necessary.

Other possibly significant statements made during the course of the discussion included an indication from Phillips that Bell is now free to offer electronic publishing services — a "content" as well as "conduit" offering — because the restrictions against such an activity, pending legislation, are based on the tie between AT&T and its soon-to-be-divested operating companies.

CW at
Comnet '82

In addition, Herb Jasper, executive vice-president of the Ad Hoc Committee for Competitive Telecommunications (ACT) — a major antagonist of Ma Bell prior to the settlement — made it clear that "we have no plans" to attack the accord. Divestiture, he explained, will substantially reduce the incentive of Bell operating companies to discriminate against specialized carriers. But Jasper added that "it isn't clear" whether ACT members or AT&T's Long Lines Division should pay a subsidy to Bell operating companies in order to hold down the cost of local service.

Verveer also voiced the expectation that the FCC computer inquiry decision, which has been appealed to the U.S Court of Appeals in Washington, D.C., will be remanded to the commission for further consideration in view of the FCC/AT&T antitrust settlement.

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# *Higher Local Phone Rates for Consumers Initial Concern of Users at Show*

**By Bruce Hoard**
CW Staff

ATLANTA — Higher local telephone rates for consumers were the first concern of many attendees at the Communication Networks (Comnet '82) conference held here last week when they were asked how end users will be affected by the settlement of the U.S. vs. AT&T antitrust suit.

"Rates are certainly going to go up for people who use telephones," P. Michael Henderson, director of product planning for Paradyne Corp.; said. He cited the end of subsidization from Bell's Long Lines Division as the impetus for the increased rates.

"They say it's going to cause the basic telephone rates to go up because long distance will no longer be subsidized. But local telephone companies should still be obtaining revenue from AT&T," Bill McAllister, communications systems analyst for the state of Georgia, said.

"As far as the telephone consumer is concerned, I think he will be adversely affected," according to Dorothy M. Davidson, president of Dot Data Systems. She foresaw no significant impact on data communications users.

Industry competition was on the mind of Charles Byers, president of Access Control Systems. "I think when AT&T gets into the marketplace, you're going to find some major shakeups when they start competing with some of the smaller companies," he predicted. However, "I think there's always going to be a niche for smaller companies. They're more innovative and they react more quickly."

Bob Tawoda, marketing manager for the Peril Corp., also looked at the question from an industry angle. "It's going to help the end user while allowing individual phone companies to go out and get better prices from the manufacturers," he noted.

"I think end users will be helped if they're in business," W.W. Smith, president of Zaiaz Corp., noted. "If they're local consumers, then costs will be greater. They'll have to pay their fair share." The cost of rural telephone service may go up, he added.

### Rosier Future

Richard Sadler, manager of management information systems and DP for Babcock & Wilcox, also forecast a rosier future for end users. "From my standpoint, I think they'll benefit. I think AT&T will be able to put a better product together."

"I hope the end users are affected with more availability of vendors and lower prices," Susan Jelinek, senior operations analyst for the Kemper Group, said.

Mike Hurd, editor and general manager of Harris Electronic News (not affiliated with Harris Corp.) criticized the media's coverage of the case. "I think some of the magazines are making too much of the political and technical issue," he said, adding that sociological impacts have been largely ignored.

Auggie Blegden, president of the Association of Data Communications Users, called on users to take a stand. "I think it's going to have a significant effect on users, but I can't be more specific yet," he observed.

"The main thing users should keep in mind is they can't be passive any more about these things. We're in a revolution in communications. People think they've seen changes, but they 'ain't seen nothin' yet," he said.

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# PBX Called Communications Key to OA

By Bruce Hoard
CW Staff

ATLANTA — The private branch exchange (PBX) is the communications key to the office of the future, Richard Manzo, manager of corporate telecommunications for American Hoechst Corp., told attendees at the Communication Networks (Comnet '82) conference here last week.

Manzo claimed the PBX will win out over the currently dominant CPU-based star networks and broad- or baseband-loop or bus systems.

Stating that the number of CRT terminals appearing at telephone locations is growing rapidly, he claimed the most logical way to tie voice and data together is through the PBX, which is readily accessible to many workstations via telephone two- and three-pair wiring.

The telephone networks currently in place can carry data at speeds up to 56K bit/sec simultaneously with voice, he said, adding that user transparency comes from the easy installation of additional lines and terminals.

CW at Comnet '82

### High Reliability

PBXs must have high reliability and some of the newer offerings feature redundancy that can take over transparently in the case of an outage, he said. "The PBX in the office of the future is going to have to be as reliable as your telephone is today," he asserted.

He cited support as one factor in favor of PBXs. If a PBX is supported entirely by one vendor there is little cause for concern over repairs. The troubleshooting capability of vendors is also becoming "highly refined," he claimed.

Built-in protocol and format conversion is another advantage of PBXs, according to Manzo. The welter of computer-based devices destined for use in the office require those capabilities, he noted.

Some PBX vendors currently offer hard wiring designed to handle conversion, although in some cases users may have to write their own software if none is available from the vendor.

On the subject of voice and data PBXs, he said that newer models offer the two or three-pair wiring, which can deliver 128K bit/sec of data directly to the user's handset.

He admitted they are not highly suitable for full-motion video transmission, saying, "Where you need full-motion video, put in coax."

Speed calling and call forwarding save time and increase efficiency.

In the future, white-collar workers will be able to forward their calls through their work place, making them accessible for voice and data reception whether they are at their desks or not, according to Manzo.

Call detail recording will enable managers to monitor data calls much as they do voice calls now. "Wouldn't it be nice if you could apply the same strengths to data users in the office of the future?" he asked.

In a lament long familiar to conference and seminar goers, he complained about management's reluctance to embrace office automation. Management will not even accept the fact that office automation is really going to be a force in the future, he said.

Manzo alluded to the Datapoint Corp. ISX, the Itecom IBX, the Anderson-Jacobson and the Lexar as four voice-data PBXs that are currently in production. "Those four purport to be quite ready," he said.

Beginning to end, the process of installing a PBX takes three years, Manzo explained: one year to evaluate needs, another year to evaluate offerings and a final year for implementation.

"I feel strongly this is the way the office of the future is going to go," Manzo explained.

### Tidal Wave

The "office of the future" — whether it is called by that name or another — "is going to come like a tidal wave," Manzo predicted.

The driving factor for office automation is stultified U.S. productivity, he declared, quoting an Arthur D. Little study that spanned the years 1960-1979 and reflected a 1.8% yearly productivity growth rate for the U.S. versus a 7.1% figure for the Japanese.

Other factors stimulating office automation growth include decreasing hardware costs and communications deregulation, of which the telecommunications manager said, "It's happening faster than we thought."

# PVI Users Group Meet Set

BOULDER, Colo. — The third annual DI-3000 Users Group meeting will be held here March 17-18. The meeting immediately follows a two-day course on device-independent computer graphics, sponsored by Precision Visuals, Inc. (PVI).

Recent developments and proposed enhancements will be discussed at the meeting, and various users will present actual applications based on their experiences using PVI products.

The meeting costs $100 to attend, and further details can be obtained from Lonell Pilgrim at PVI, Suite 303, 250 Arapahoe Ave., Boulder, Colo. 80302.

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## *Will Go Beyond Current Offerings*

# AT&T Exec Drops Hints About Videotex Plans

**By Phil Hirsch**
CW Washington Bureau

ATLANTA — AT&T's assistant vice-president for residence product management and development dropped some hints about the firm's videotex plans during a panel session at the Communication Networks (Comnet '82) conference here last week.

A $75 monthly charge for a commercial videotex service is "a little high," Dennis J. Sullivan Jr. said after a fellow speaker mentioned that figure as the price the phone company was planning to charge.

According to Sullivan, AT&T expects to have all the market research data it needs to launch a commercial videotex service within a year or two. The information will come from two already announced trials — one in Miami, in collaboration with Knight-Ridder newspapers, and the other in Ridgewood, N.J. The Columbia Broadcasting System (CBS) will function as Bell's partner in the latter venture.

The settlement of the U.S. vs. AT&T antitrust case, which revokes AT&T's 1956 consent decree, frees the company to become an electronic publisher as well as a supplier of transmission service to other electronic publishers, according to Sullivan. However, because of commitments to Knight-Ridder and CBS, the phone company will not enter the publishing field immediately.

Sullivan acknowledged that legislation now pending in Congress would require Bell to offer videotex through a separate, dedicated subsidiary and also would prohibit the company from providing the information as well as the circuits. But divestiture of the Bell operating companies eliminates the need for these limitations, he maintained.

CW at
Comnet '82

AT&T's upcoming videotex service will be based primarily on real-time transactions between the viewer and the information provider, Sullivan continued. Home banking, home shopping, income tax and similar problem-solving applications were specifically mentioned. AT&T also intends to offer electronic messaging and video games, Sullivan noted.

He added that the company intends to go beyond current offerings in each area. For example, the home shopping service would store the viewers' list of grocery needs for a week within the central data base. Changes could be entered on-line each week and then the whole shopping list would be transmitted to a store for later pick-up or delivery. The viewer, in exchange for giving the store a recurring bulk order, would receive a substantial discount.

Another speaker, Larry Pfister, vice-president of Telidon Videotex Systems, Inc., the chief U.S. promoter of Canada's videotex technology, said that "major commitments are being made toward implementation of videotex systems in the U.S." The latest commitment to be announced is the plan of the Times-Mirror Co., Los Angeles, to establish Telidon-based systems across the country. "We expect this venture, in conjunction with local partners in major metropolitan areas, will result in approximately 20 strategically located . . . systems . . . within the next three to four years," he added.

Like Sullivan, Pfister indicated that commercial success of videotex will depend on transaction-based applications.

"With . . . publishing or broadcasting . . . the advertising 'courtship' is separate from the purchase 'conservation,' so we never really get to see the good part. Videotex, in comparison, allows the viewer to change roles from prospect to customer instantly, with the fabled 'push of a button.' In advertising or conventional retailing, the merchant hopes that . . . his offering will arrive at a point of sufficient interest for his target . . . With videotex, however, the consumer can make purchases at his or her peak point of interest, virtually eliminating the risk that the sales promotion will be seen too early or, worse still, the day after a buying decision was made," Pfister said.

# Airline's Plan To Freeze Wages May Ice DPers

MIAMI — A one-year wage freeze agreed upon by 18,500 nonunion employees of Eastern Airlines here recently will affect all of the firm's DP personnel if it is approved by two other union groups.

The wage freeze could go into effect on April 1 if the two union groups approve it, according to a spokesman for Eastern. The measure was described by Frank Borman, chairman and president of Eastern, as an attempt to help the airline through the year after record losses during 1981 — caused in part by the air traffic controllers' walkout and subsequent flight cutbacks.

As described by Eastern, the "wage pause" will affect ticket agents, reservations agents and management personnel. It reportedly was endorsed by 83.1% of all nonunion employees who voted on the measure.

Eastern employs a total of 37,500 people. There are approximately 1,100 DP personnel at its Miami location alone.

Eastern refused to comment on the possibility that a wage freeze will lead to a loss of DP personnel who most likely can move on to other jobs rather than accept a cutback.

Borman indicated that the airline reached a tentative contract agreement with the Air Line Pilots Association International. This also calls for a wage freeze for Eastern's 4,000 pilots.

# ADL Schedules Market Sessions

CAMBRIDGE, Mass. — "World Markets for Information Processing Products in 1991" will be the subject of a series of meetings and audio conferences to be held this month and next by Arthur D. Little, Inc. (ADL).

The meetings, which will examine every class of hardware and software that relates to the end-user marketplace, will by held here Jan. 21; in New York, Jan. 22; in Dallas, Jan. 25; and in San Francisco, Jan. 26. Audio conferences, in lieu of the face-to-face meetings, are scheduled for Jan. 28-29 and Feb. 1.

The objective of the meetings will be the formation of an "outlook report" to assess the major trends in each product category and the maturity of principal worldwide DP markets. ADL's Frederic G. Withington and Oscar H. Rothenbuecher will take part in the study, along with representatives from the firm's Wiesbaden, West Germany, and Tokyo offices.

The fee for the report, which covers participation in a preview audio conference or meeting, is $2,000. Additional information can be obtained from Jane Killeen, ADL Decision Resources, 17 Acorn Park, Cambridge, Mass. 02140.

# Graphics Meet Set for Feb. 17-19

MIAMI — The Institute for Graphic Communication will hold a three-day meeting here next month focusing on the business applications of computer graphics.

The meeting, which will take place Feb. 17-19, will concentrate on the use of computer graphics by small- and large-business executives to distill information. Topics covered will include desktop graphics terminals, wall-size graphics displays, color and black-and-white hard copy, color graphics in the electronic office and computer-based documents.

The meeting will include a discussion on selecting the right business graphics systems.

Sessions will be chaired by Carl Machover, president of Machover Associates Corp. in New York. Conference leaders include Dr. Irwin M. Jarett of Irwin M. Jarett & Associates, Inc.; David A. Monroe, Datapoint Corp.; Ralph Swick, Digital Equipment Corp.; and Randall E. Wise of Graphic Communications, Inc.

The registration fee for the conference is $695, which includes hotel accommodations and six meals. More information is available from Richard D. Murray, director of conferences for the Institute of Graphic Communication, 375 Commonwealth Ave., Boston, Mass. 02115.

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## *Credited With Japan's Rise*

# Quality Circles Recommended for Productivity

**By Brad Schultz**
CW New York Bureau

ATLANTA — DP managers can greatly boost their staff's productivity using a management technique called "quality circles" that had much to do with Japan's rise as an industrial giant.

Consultant Herb Schwartz, who reportedly ran more supercomputers years ago than anyone else in the federal government, explained at a productivity seminar here last week why he views quality circles that way.

Formerly systems chief at the now-defunct Atomic Energy Commission and now general manager of Potomac, Md.-based Designtech Corp., Schwartz told the Data Processing Management Association (DPMA) gathering that quality circles sent DP output soaring at Lockheed Corp. An attendee vouched for similar success at Sun Information Services Co.

Quality circles are groups of up to seven staff people, convened regularly (typically for an hour per week) to hash over work-related problems under the guidance of a circle leader. The circle leader is specially trained for this purpose and coordinated with other circle leaders by a "facilitator" — an expert in quality circle techniques, Schwartz explained.

Quality circles apply to many kinds of manufacturing and production operations, but the approach meshes well with research into motivation of DP professionals, Schwartz argued.

In a DP department, where productivity is measured in terms of how much code is written in a time frame, a steering committee of senior DP people would oversee a manager of the quality circle program. This manager would supervise the facilitators, who coordinate several quality circles, ensuring that they are properly trained and coping with any friction between the program and outside parties, Schwartz noted.

Facilitators may, in practice, have other jobs in the DP department, he pointed out. But the role of facilitator approaches full-time commitment when it takes on around seven or more circles.

Quality circles would, therefore, cause the DP department to expend managerial time and meeting and steering committee time, Schwartz pointed out, and would require a process of management education, employee training and "occasional high implementation costs." Nevertheless, the rewards of raised productivity and employee morale more than justify such cost, the DPMA session was told.

To see that, he suggested attendees look at Japan, which wrested from the U.S. its world leadership in several industries after losing a war to the U.S. in 1945. Ironically, the quality circles approach so popular with Japanese manufacturers was developed in the U.S., he stated. In fact, General Douglas MacArthur's occupational forces introduced Japan to modern techniques leading to a quality circle in 1946.

Within a quality circle, programmers and analysts might talk about problems they have in understanding what end users want software to do, technical problems related to systems facilities and the design alternatives worth considering on a project. Membership in, and leadership of, a quality circle must be voluntary, Schwartz emphasized.

The tempo of discussions in a circle should be informal and mutually supportive, he said. There is no room for much grandstanding by an individual member; credit for what the circle accomplishes belongs to the circle, not to its particular members.

### Out of Bounds

Certain problems are not legitimate topics for discussions in a quality circle, Schwartz observed. These include salaries, management performance, "users' hidden motives" and aspects of someone's personality.

In some ways, a quality circle might take on the trappings of a study group, Schwartz indicated, but work the circle assigns to members — for completion in addition to normal job duties — would normally be limited in scope and possibly compensated for by the company.

Schwartz described the benefits of quality circles in terms of a model for psychological needs proposed by psychologist Abraham Maslow. The model postulates five tiers of basic needs — physiological, safety, belongingness, esteem and self-actualization — which, in that order, an individual may seek to satisfy.

But in industrialized nations, the bulk of the population worries most about the need to belong and esteem, Schwartz explained. Many people's worries never focus on more than physiological needs, such as food and shelter and safety needs, such as protection from maliciousness. Quality circles, he said, raise staff morale by allowing people to feel they belong to a group that cares about them and their views and that esteems their judgments on a variety of issues.

## *Not Big Brother*

ATLANTA — The quality circle is not a new way to control people, monitor them or watch over them, consultant Herb Schwartz maintained at a Data Processing Management Association (DPMA) seminar here last week.

Instead, the quality circle is a new way to build quality in an organization, providing for line execution of quality improvement for the DP department. Ultimate objectives of a quality circle would be improved information services and systems, better information from those services and systems, more informed managers in the organization as a whole and simply a better organization.

Immediate objectives for the DP department's quality circles would be heightened motivation, confrontation of problems, more productive work and reduced cost to the organization from unproductivity, Schwartz continued. Longer term objectives include:

- Greater job satisfaction.
- Less staff turnover.
- Improved development of future managers.

While quality circles are widespread in Japanese manufacturing companies, the U.S. is just beginning to give the approach a try, Schwartz noted. The international Association of Quality Circles has an office in Oklahoma. But the U.S. lacks national and regional organizations that regularly hold conferences on quality circle techniques, he told attendees at the seminar.

Some resistance to quality circles can be expected in the U.S., Schwartz cautioned. Unions may object, perhaps protesting that circles force more work on people without compensation. Actually, quality circles represent opportunities for people to help each other; no one should ever be coerced into participating, he said.

Other resistance could come from managers who view the circles as undermining necessary regimentation, sapping the competitive spirit or simply too newfangled, he said.

# Course Slated For Managers

DALLAS — "Effective Data Processing Communications," a two-day workshop designed to build the listening, verbal and negotiation skills of DP professionals, will be held in 12 cities this year by the Harvard Human Resources Co.

The dates and sites of the workshop are Feb. 25-26 in Minneapolis; March 17-18 in Houston; May 3-4 in New York; May 6-7 in Washington, D.C.; June 14-15 in Los Angeles; and June 17-18 in San Francisco.

Sponsored by Control Data Corp.'s Institute for Advanced Technology, the objective of the workshop is to increase the DP professional's abilities and increase productivity within the DP department through improved teamwork and communication.

The cost of attending is $480 prepaid and $530 invoiced. More information is available from the Institute at 603 Executive Blvd., Rockville, Md. 20852.

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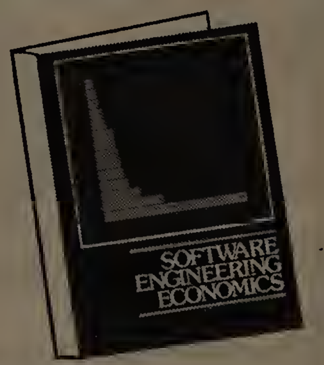

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# Candle Corp. Analysis Sees End of Road for MVS/370, Eyes Growth Path in XA

**By Lois Paul**
CW Staff

LOS ANGELES — IBM's MVS/370 operating system is at the end of its evolution and only the recently announced MVS/Extended Architecture (XA) system exists as a growth path to the future, according to a report compiled by Candle Corp. here.

Entitled "IBM Large Systems Announcements," the analysis by Candle's vice-president for technical services, Martin J. Sprinzen, was based on IBM's announcement in fall 1981 of MVS/XA [CW, Oct. 26].

"We feel we are in a different position than many other companies," Sprinzen explained, because in addition to market survey analyses of major IBM announcements, Candle conducts in-depth technical evaluations on an as-needed basis. This is the third report of this type the company has issued.

The report indicates that although IBM claimed it will continue to enhance MVS/370, these enhancements primarily will be included to sell additional hardware. MVS/370 will continue to be supported by IBM as long as MVS/370 processors are around, at least for the next five years, the researchers added. IBM therefore will not need to force users to convert from MVS/370 to MVS/XA. "It is the lure of added function in the XA environment that will do it," the report said.

With regard to the VM operating system, Candle's report predicted that a VM/XA and a high performance option to run MVS/XA under VM will be announced, IBM will continue to improve and enhance CMS as a development tool, full Vtam (and possibly Vsam) support will be available, and VM will be kept more up-to-date with MVS developments than before.

### Data Communications

In the data communications area, it is Candle's belief that IBM will continue to offer both the IMS and CICS products to satisfy different user requirements. "The large systems distributed capabilities being introduced [MVS/OCCF] will further enhance the usefulness of IMS/DC and CICS."

The report further predicted that IBM will add a relational data base capability to IMS that could be the large system (MVS) equivalent to Structured Query Language (SQL). "Alternately, we may see both a separate SQL program product for MVS and relational capabilities in IMS/DB."

As data base and data communications systems and access methods exploit the MVS/XA architecture more functions will be added, the report indicated. "IMS [IBM's data base management system], for example, will be able to do much more in 2G bytes than in 16M bytes. Such functions will not [actually cannot] be supported in the MVS/370 environment."

Candle speculated that as MVS/XA evolves, IBM will continue to make changes that improve performance, such as I/O service times, and more functions will be assisted with custom microcode.

The Candle report predicted that MVS/XA eventually will enable more functions to be called by users executing in the extended private area. Another area in which MVS will change with time is in the use of XMS (cross memory services), which will enable more MVS components, subsystems and applications to use the XMS facility and extended addressing.

In the area of virtual and real storage, new 2G-byte virtual capability opens the door for significantly larger applications to be developed, the report continued. Although IBM has not yet announced compilers that will use this storage, these will come, according to Candle. "Then, IMS and CICS can fully exploit this capability."

Another IBM trend that Candle believes will continue is I/O off-loading. The Dynamic Channel Subsystem was cited as a significant step in that direction.

"With the 3880 control unit announcements [Models 11 and 13], IBM has taken a giant step forward in the area of storage management," the report continued. Another enhancement predicted for the 3880 was the capacity for cache memory sizes in excess of the announced 8M bytes maximum. The report added that another possible use for the 3880 might be as part of a system to replace "the aging 3850 [mass storage device]."

MVS software will continue to evolve in the area of storage management, according to Candle, which speculated that the Hierarchical Storage Manager may eventually be fully integrated into MVS. "Storage management is one of the primary bottlenecks in allowing programmers to become more productive."

The Global Resource Serialization facility of MVS that was announced with MVS/SP 1.2 will eventually evolve into a useful method of data sharing, according to Candle.

The "IBM Large Systems Announcements" report is available to Candle users for $100 and to other interested persons for approximately $400. Copies may be obtained by contacting Candle Corp. at Suite 2404, 10880 Wilshire Blvd., Los Angeles, Calif. 90024.

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# Consultant: Confused? Let Vendors Choose CICS Tools

**By Robert Batt**
CW West Coast Bureau

SAN FRANCISCO — Users faced with a bewildering choice of software tools for use with IBM's CICS/VS transaction processing monitor should let the vendors do the selection work for them.

This was the advice given to DP managers and applications programmers at a Software Decisions Symposium held here recently by Vaughan Merlyn, president of Merlyn Corp., an Atlanta-based independent software consultant.

The secret to choosing the correct software tool, Merlyn said, is to evaluate as many products and solutions as possible in a short amount of time. "The objective is to get as detailed an evaluation as possible and then squeeze down the choice to the eventual winner. The best way to do this is to allow the vendor to do the process for you."

In the process of evaluating a potential sale, the vendor wants to know two things: whether the buyer is serious and whether the product can do what the user wants it to do, according to Merlyn. "If one or both of these criteria are not true, the vendor will not put much effort into the sale. So, as a user, let the vendor do the qualifying for you.

"This depends on you as a customer, knowing what you want," he added.

Merlyn advised his clients to put questions to the vendors in writing and ask for a written reply. "You get a much more solid response this way because the vendor is that much more careful to make sure there is no misunderstanding."

He urged users to be realistic in choosing a suitable software tool such as an applications generator. "None of the products on display are going to be perfect solutions. There are going to be trade-offs between the good and the bad. So set a timescale for your decision — this gives you the ability to control a major software evaluation project."

Merlyn had some tough things to say about vendors. Sellers would have you believe that there is one problem called CICS productivity and that the solution to that problem lies with their product. "That is an incredibly naive assumption," he said.

A particular user problem might be related to programmer productivity or to the need for better prototype technology. Does the user need a Cobol replacement or will the problem be resolved with a new CICS interface?

The problem of CICS productivity is manifested in four ways: high backlogs, high maintenance costs, a credibility gap with the user and a lack of CICS expertise, according to Merlyn.

"The vendor says, 'I have the answer.' But they all have different answers. They identify the problem differently, coming from their own strengths and ignoring their weaknesses," Merlyn said.

## Understanding User Needs

This, he argued, makes life very difficult for the user because the vendor "solution" is often limited to a subset of the problem. One vendor may say that there is a data entry problem and provide a package to deal with that. Another vendor will argue that the problem is with screen mapping and that the solution lies with its interactive mapping system.

The objective of the symposium, which is being delivered at various cities throughout the nation, is to give users a generic understanding of software tools that simplify or speed up the development of applications programs running on-line under CICS/VS.

According to Merlyn, most users are asking the wrong questions about the products they are being urged to buy. The emphasis of the symposium is on understanding user needs and the types of products being offered. Software tools examined in depth include Series 80 Mantis from Cincom Systems, Inc., Trans IV and Answer/DB from Informatics, Inc. and Central Software, a systems development tool designed by Planning Research Corp.

In order to understand his real needs, Merlyn argued that the user must distinguish job types. "Is it possible, for example, to separate high-performance, high-volume applications from peripheral applications? Where are productivity gains to be made? Can you as a user afford to give up Cobol? These are some of the questions to explore," he said.

In considering future needs, Merlyn said that resource commitment was all important. It is vital to make a choice and then to invest your resources to make that choice work, he said.

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# Battelle Offering DP Seminars

SEATTLE — The Battelle Memorial Institute is offering a series of seminars on "Data Processing & Information Technology" between now and June.

The two-day seminars cover a range of DP-related topics, including "Strategic Planning for Management Information Systems," "Decision Support Systems" and "Data Processing and Office Automation."

The list of cities includes New York; Washington, D.C.; Chicago; Boston; Los Angeles; San Francisco; Seattle; Pittsburgh, Pa.; Minneapolis; Atlanta; Houston; New Orleans; Columbus, Ohio; Dallas; Detroit and Ft. Lauderdale, Fla.

The registration fee is $495.

More information is available from the Battelle Memorial Institute, 4000 N.E. 41st St., P.O. Box C-5395, Seattle, Wash. 98105.

## *Report Looks at Future*

# Hardware Changes Said Mark of DP Evolution

**By Bruce Hoard**
CW Staff

FRAMINGHAM, Mass. — Dramatic improvements in hardware development and the increasing generality of equipment have marked the evolution of computer components ranging from dumb terminals to mainframes, according to a recent report from International Data Corp. (IDC).

The report, *Research Memorandum Future Technology Trends: 1982,* is organized around four basic categories for technology assessment established by IDC's Information, Industry and Technology Service (IITS). The four categories are resource stations, communications backbone, interfaces and software and design.

The hardware improvements are found in the resource station category of the memorandum. "Resource stations include all of the nodal components of a computer and communications station, from dumb terminals on up to the largest of computers," the report notes.

Under that segment, microprocessors are called the most important development in small systems and equipment and their growth from eight to 16 bits and beyond is discussed. Referring to desktop/personal computers, the report comments on current offerings, including the IBM personal computer.

Large system architectures and large system storage trends are also addressed.

### Communications Backbone

Turning to the communications backbone category, IITS lists three primary ranges for communications — long distance, metropolitan area and local area — saying each is being transformed.

The memorandum calls the growing availability of options for satellite transmission "the primary development in long-distance data communications." The most important aspects of satellites' impact are the potential for reduced costs and competition and the incipient availability of wide bandwidth transmission facilities to users.

Digital termination services are seen as a cure for the "real bottleneck" in satellite transmission. Although that bottleneck may not exist for large users who can afford their own earth stations, it is a real problem for smaller users who cannot. A discussion of the technology and companies involved is presented.

The pros and cons of broadband and baseband local-area networks are discussed, and the report predicts "broadband CATV implementations are likely to emerge as the dominant method for local-area networking over the next several years."

Private branch exchanges probably will not provide the backbone of the future for general local-area networking because of limited transmission speed capacity and the requirement for traditional call establishment procedures, IITS reports.

Within the interfaces portion of the memorandum, graphics is referred to as a change in the underlying technology providing the foundation for future systems developments. Two areas of graphics are alluded to in the report — computer-aided design and display of business information.

Robotics is an important part of computer-aided manufacturing and robot assemblers, welders and painters, plus more sophisticated computer controlled tools "will be critical factors" in the quest for productivity, the report claims.

Describing voice synthesis and recognition, the 29-page report says voice recognition is becoming more popular despite its limited current applications. Artificial intelligence is called important for the interaction of human beings with information systems.

### Software/Design

The fourth basic category is software and design. Comments on the subject include an assertion that before software or system engineering can truly become an engineering discipline a real science of software and systems will be required. Recent developments indicate such a science is possible.

Some of the basic features of emerging software technology mentioned are:

- Continued improvements in high-level user-friendly languages for data analysis and manipulation.
- Newer and more powerful programming languages such as Pascal, Ada, Forth, C, APL and Lisp.
- Data base management systems built on the relational model.
- Increasing availability of software functions in hardware or firmware.

More information on *Research Memorandum Future Technology Trends: 1982* is available from IDC, 5 Speen St., Framingham, Mass. 01701.

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# Managers on the Move

ERNEST A. STUMPF has been named vice-president of the newly formed Management Information Systems (MIS) Group at C. M. Offray and Sons, Inc., a New York-based fabric manufacturer.

Stumpf was formerly administrative vice-president of the MIS program at that company. Before coming to Offray, Stumpf was vice-president of administration at Esquire, Inc.

After earning his B.B.A. degree in finance from St. Johns University, Stumpf received his M.B.A. degree from Long Island University. He is a member of the Data Processing Management Association, the Association of Time Sharing Users and the American Management Association.

•••

THOMAS E. DAMM has been appointed manager of data processing for Cadillac Plastic and Chemical Co., based in Birmingham, Mich.

Damm is now responsible for the firm's DP functions and the development of word processing systems. Prior to joining Cadillac Plastic in 1979 as a systems and programming manager, he worked for Dayco Corp. in Dayton, Ohio, as corporate systems analyst.

Damm earned a B.S. degree in computer science and mathematics from Miami University in Oxford, Ohio.

•••

PAUL DEANE has been named director of information services at Platt Saco Lowell Corp., located in Greenville, S.C. In his new position, Deane will continue his present duties of directing the DP functions and will also coordinate all automated information systems at the company.

Deane joined Platt in 1967 as manager of data processing, a post he held until his recent promotion. Before that, he worked at Her Majesty Industries of Mauldin and the Aluminum Company of America and taught commercial courses at Everett High School in Maryville, Tenn.

After earning his B.S. degree from Lincoln Memorial University, Deane served in the U.S. Navy and then he earned an M.S. degree in administration and supervision of education at the University of Tennessee. He is a member of the Data Processing Management Association and the Association of Systems Management and is active in civic affairs.

•••

CHARLES F. BATES JR. will join the American Bankers Association (ABA) as director of operations and automation in Washington, D.C.

Bates is joining ABA from Bank Earnings International, where he was vice-president and consultant for bank operations, data processing and earnings improvement.

Bates attended the Illinois School of Banking, Southern Illinois University and also graduated from the Stonier Graduate School of Banking, Rutgers University. He has also taught at both schools, as well as the Colorado School of Banking and the School of Banking of the South, at Louisiana State University.

•••

CHARLES F. O'HARA has been named vice-president of Imperial Bank's Computer Operations Division in Los Angeles. In his new position, O'Hara is responsible for the maintenance and support of the bank's on-line system.

Ernest A. Stumpf

Prior to joining Imperial, O'Hara was a vice-president with IDR Northeast, in charge of computer installations and operations. Before that, he worked for 15 years at Bankers Data Processing, Inc., where he began his career as a programmer and left there as an executive vice-president.

O'Hara received a B.S. degree in finance from Northeastern University and served six years in the U.S. Air Force Reserve. He is a member of the Association for Computing Machinery, the Data Processing Management Association and the Bank Officers Association of Boston.

•••

SIDNEY DIAMOND has recently been elected senior vice-president of management information systems, and an officer, of Purolator Courier Corp. in Hyde Park, New York.

Diamond is responsible for all corporate data processing, telecommunications, systems and programming and advanced MIS planning. Prior to joining Purolator, he was director of corporate systems at the Continental Group in Stamford, Conn.

Diamond earned his MBA degree from Pennsylvania State University and has spoken and written widely on the topic of long-range planning and corporate technology.

•••

CALVIN MASSEY has joined Cipher Data Products, Inc., San Diego, Calif., as management information systems manager.

In his new position, Masey will be in charge of implementing Cipher's DP system to provide total MIS support throughout the company. Before joining Cipher, he was manager of data systems at Datagraphix and also worked at General Dynamics Corp. as supervisor of systems development and programming.

Massey holds a B.S. degree from San Diego State Uni-

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# Managers on the Move

Jerry Mollerup

Robert Rush

versity and an MBA from National University, where he currently teaches courses in information systems.

• • •

ALITA L. MARSHALL has been appointed a vice-president with the high-technology unit of the Corporate Banking Department at Security Pacific National Bank in San Francisco.

Marshall joined the bank as a loan assistant in 1976, was promoted to account officer in 1978 and was named assistant vice-president in 1979.

She is a graduate of the University of Pennsylvania, where she earned a B.A. degree in sociology. She earned an M.B.A. degreee in finance from the University of Southern California. A founding member of the National Black M.B.A. Association, Bay Area Chapter, Marshall also belongs to the National Urban League.

• • •

RICHARD L. NORRIS has joined Mitsubishi Motor Sales of America (MMSA) as director of information systems. MMSA is the newly formed marketing arm of Mitsubishi Motors Corp. and is based in Los Angeles.

Norris came to MMSA after 14 years with IBM, where since 1976 he served as a specialist in the development of data management systems for the automotive industry. He will now direct the development of business, management and inventory systems in advance of the fall 1982 introduction of a new line of 1983 model cars and pickup trucks.

Norris received a B.S. degree in industrial engineering from Pratt Institute in Brooklyn, N.Y., and earned an M.S. degree in operations research from New York Polytechnic Institute.

• • •

JERRY MOLLERUP has been promoted to vice-president at The General Mills Restaurant Group, Inc., Orlando, Fla.

Mollerup will head up the company's new data center, which will be fully operational by mid-January. It will provide management information services and point-of-sale systems to the General Mills Restaurant Group companies consisting of Red Lobster Inns, York Steak Houses, Darryl's, Casa Gallardo Mexican Restaurants and The Good Earth health food restaurants.

Mollerup joined Red Lobster Inns in 1976 as a financial analyst and was promoted to manager of capital investment analysis one year later. In 1978 he was named manager of purchasing and menu analysis and was promoted to manager of corporate analysis in 1979. Most recently, Mollerup served as director of management information services for the General Mills Restaurant Group.

• • •

ROBERT RUSH has been named vice-president of Del E. Webb Corp.'s management information services department in Phoenix.

With over 20 years of technical management experience in manufacturing, consulting and government sectors, Rush's former responsibilities included budget, long- and short-term planning, hardware and software planning and implementation, project management and educational programs. He has previously worked for ITT General Controls, Interpace Corp., Management Science America, Inc., the federal government and Eastman Kodak Co.

Rush received his B.S. degree in general engineering from the U.S. Military Academy at West Point and then earned a master's degree in engineering administration from George Washington University.

• • •

THOMAS M. ETTZ has been promoted to the newly created post of vice-president of management information systems at Universal Manufacturing Corp. of Paramus, N.J.

Universal is a manufacturer of fluorescent and high-intensity discharge lamp ballasts in the Northwest Industries, Inc. family of operating companies. Ettz joined the company in July 1980 as director of MIS.

He earned his MBA degree from Seton Hall University after completing his undergraduate studies at Fairleigh Dickinson University. Ettz is a past president of the Data Processing Management Association, North Jersey Chapter, and has served as a member of the board of directors of the Northern New Jersey Chapter of the American Production and Inventory Control Society.

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The listings also include Fortune rank, chief executive officer, current revenue, total number of employees and principal area of business.

The directory costs $95 from IRD at 30 High St., Norwalk, Conn. 06851.

# Lloyd's Insures Against EFT Theft, Writes First Policy for Irving Trust

**By Marcia Blumenthal**
CW Staff

NEW YORK — The Stanley M. Rifkins of the world make bank data processing and security departments very, very nervous. Rifkin, you may remember, is the person who several years ago pulled off what is considered the largest publicly acknowledged electronic funds transfer (EFT) heist when he managed to transfer $10.2 million from the Security Pacific Bank of Los Angeles to a Swiss bank account.

Now, however, Lloyd's of London is offering a new type of insurance coverage that protects financial institutions from theft involving computers.

The first "Electronics and Computer Crimes" policy was issued last September to Irving Trust Co. here.

Although Irving Trust has not incurred any losses through EFT theft, the bank was concerned because the Surety Association of America, the organization that makes policy on bankers bond, largely barred coverage for EFT theft, noted Burton J. Cardino Jr., Irving Trust's senior vice-president in the Risk Management Division of the bank. This division has responsibility for data security.

### Underwriters' Study

Specifically, banks could not obtain insurance for EFT thefts except in cases where direct employee dishonesty was involved, Cardino noted. Disturbed about this gap in coverage, Irving Trust approached Lloyd's, the London-based insurance underwriting syndicate, two years ago to explore the possibility of more generalized coverage for EFT and other electronic-type thefts.

Interested in the possibility of offering such coverage, three Lloyd's-associated underwriters funded a study which concluded that there was a need for electronic and computer crime insurance.

In announcing the availability of the new category of insurance recently, Lloyd's noted that in the early 1970s, when banks converted to electronic systems, there was a general ignorance of how those systems worked.

### Theft Opportunities Up

"However, the advent of personal computers and the ability to tap into systems illegally has greatly increased the risk [of electronic theft]," Lloyd's noted.

The opportunity for electronic thievery is enormous, with about $600 billion transferred by computer from one institution to another in the U.S. alone, noted George Jones, the spokesman for Stewart Wrightson Ltd., one of the three Lloyd's brokers underwriting the insurance.

U.S. brokers have noted a significant interest in the coverage from financial institutions, but as yet not many policies have been written.

The size of Irving Trust's policy is confidential, but Cardino noted the deductibles for such insurance will be high, probably in the $1 million range.

### Application Procedure

Although Lloyd's is known for its high-risk posture in insurance coverage, it has developed a careful application procedure for the new coverage.

The application for coverage involves three stages, Irving Trust's Cardino noted. The application process was developed by several organizations, including Lloyd's and the Washington, D.C.-based consulting firm of Wood, Butko and Kemp, among others.

Briefly, applicants for the insurance coverage must complete a lengthy audit guide prepared by the data security officer or a similar type of individual at the financial institutional, provide documentation of system control and a description of the DP environment of the institution and allow an on-site risk management survey conducted by Wood, Butko and Kemp in cooperation with Arthur Andersen auditors.

This survey deals with proprietary data that is sent to the underwriter rather than the broker, according to Cardino.

### Nonstandard Policy

The insurance coverage is not a standard, boiler-plate-type policy associated with traditional forms of insurance. Underwriters can be restrictive in areas in which they feel uncomfortable with the controls over the DP department, according to Cardino.

Irving Trust's policy has eight insuring agreements, including the computer system, automated teller machines, outside service bureaus, independent contracts and automated clearinghouse service, Cardino explained.

Right now the policies are being offered only to financial institutions, but the insurance has wide appeal to multinational companies with broad treasury responsibilities and extensive data banks.

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# Graphics Touted as Major Productivity Tool

**By Robert Batt**
CW West Coast Bureau

SAN FRANCISCO — Computer graphics will become one of the major tools for increasing productivity during the 1980s, Hewlett-Packard Co. claimed here recently.

Speaking at the company's launching of the Productivity '82 seminar series to be held in various cities throughout the U.S., senior HP executives stressed the ubiquitous nature of graphics as companies grapple with an ever-increasing information explosion.

Philip Walden, applications engineer at HP's Data Systems Division in Cupertino, Calif., said that in technical applications, there is often a need for a customized graphics system that suits a user's exact requirements.

"Turnkey systems can be rather inflexible and sometimes users cannot bend their procedures to effectively use the turnkey system." Customized graphics systems, he said, allow a more optimal solution for an application.

"It becomes possible to tailor a system directly for a specific application. Sometimes customized systems are the only solution," he added.

According to Walden, using graphics tools to develop unbiased systems also makes the systems developer more productive.

"A build-it-yourself model may get you exactly what you want, but it's going to take much longer to complete the system. Using graphics tools gives you a running start. They resolve a lot of the design problems involved in system development," he claimed.

Walden said that, used effectively, graphics tools allow developers to concentrate on the application and save time by avoiding lower-level design problems.

### Business Graphics

Turning to the area of business graphics, Rick Ferguson, HP's product line manager for graphics in the company's Data Terminals Division, said that graphics can be a very useful tool in aiding the understanding of a business. Its raison d'etre, he said, is to facilitate correct decision making, although he admitted that graphics is by no means a total solution.

Citing figures to prove his point, Ferguson claimed that reading tabular data — the classic way information is transmitted in organizations — is in fact very inefficient.

It is, he said, one of the slowest ways to get data to the brain and be understood.

On the other hand, business graphics is excellent for displaying summary data and the interrelationship between data. This is particularly useful when it comes to spotting business trends. "In computer terms, one picture is worth 114,000 words," he added.

### All Areas

Graphics can be used in all areas of an organization, the HP manager claimed. It is suitable for marketing areas where it can be used for forecasting markets and products and in presentations to customers. In the finance department, as the traditional bastion of tabular data, graphics could be useful for, say, monitoring the sales of a product historically, he noted.

In production, graphics could be used for monitoring ongoing operations, while in research and development it was ideal for showing the relationship between the different groups working on the same project.

"There is not an area in your company that could not benefit from the use of graphics," Ferguson told his audience of DP personnel, accountants and managers.

He argued that one of the intangible benefits of graphics was that it lent a sense of professionalism to any presentation that a company employee wanted to give.

### Reaping Benefits

But, he claimed, there were also unmistakeable tangible benefits to be reaped. One textile manufacturer, for example, needed to produce a complex monthly report for senior management. This usually took six clerical people two weeks of their time every month and one professional person, one week in every month.

With the introduction of a business graphics system, Ferguson said, the amount of preparation time was cut dramatically. The report now only takes two clerical people one week per month, while the professional staffer's involvement was cut to two days each month.

"It is clear from our studies that graphics pay handsomely when it comes to doing routine repetitive tasks. It not only saves on labor time, but, in this case, the reports are got more quickly. The information is, therefore, more up to date and this aids in effective decision making," he said.

Ferguson concluded by saying the ideal business graphics system was one that was so easy to use that a newcomer could go to the computer without any instruction manual and operate the graphics.

"We are not there yet, but that is the goal," he added.

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## *Instead of Ethernet*

# HP Execs Endorse IEEE Local-Net Standard

**By Robert Batt**
CW West Coast Bureau

SAN FRANCISCO — The proposed IEEE 802 standard for local-area networks should be adopted as the industry standard, according to Hewlett-Packard Co. executives here.

Speaking at the company's annual meeting with security analysts, Andre Schwager, general manager for information networks at HP's business computer group, claimed the IEEE standard offers a better architecture than Ethernet and stands a greater chance of meeting with international approval.

His message was echoed by other executives at the company's Productivity '82 show, also held here last week, in what appeared to be a concerted effort to persuade DPers to turn away from Ethernet, the controversial local-area network pioneered by Xerox Corp.

"The key advantage that IEEE 802 has is that it allows you to mix broad[band] and baseband on the same cable. Ethernet does not," Schwager said.

He argued that the flexibility offered by the draft of IEEE's 802 standard was going to be vital because users would need to have access to both baseband which was less expensive and broadband with its higher band width.

"I do not think users will be served best by having two competing networks. I would like to see the IEEE 802 voted on and implemented as quickly as possible and to have Ethernet as a subset of that." This would mean, Schwager said, that both Ethernet and the IEEE would have to give some ground.

He also said that since the IEEE was one of the U.S. representatives in the international standards arena, it had a far greater chance of having its standard approved than a private corporate development such as Ethernet. "By being a U.S. standard it becomes a candidate for an international standard."

At the same time, Schwager criticized the amount of time it was taking to decide this issue. It was "rather silly," he said, to believe that the adoption of a standard would solve all the problems.

### 'Means, Not an End'

"The network, by itself, is a means, not an end. So much energy is going into this standards thing, but we are at the lowest level discussing things to which we know the answers.

"We are on the threshold of discovering a new way to handle information. We should be concentrating on the higher level issues where there are far more important and critical things to solve," he said.

Schwager said that given the preponderance of multivendor shops there would be a great need for interconnective capabilities. No single technology could hope to solve all the problems and a mixed set of capabilities is essential, he maintained.

"Users are not going to replace everything they have and put themselves in the hands of a single vendor. This is why Hewlett-Packard supports the IEEE standard. It is a mechanism that will allow users to integrate multivendor equipment into a single network."

This strategy, Schwager said, guided the company's research and development effort. For example, HP was investing in IBM communications equipment, despite possessing its own because it recognized the value of a multivendor approach.

Commenting on findings published in *Computerworld's* 1982 budget survey [CW, Dec. 28/Jan. 4] that indicated that management information systems (MIS) departments were lack-lustre about local-area networks, Schwager noted there is an education job to be done.

"As we approach the workstation-per-person situation, after a while centralized computing will no longer make sense in terms of economies of scale and DPers will have to take advantage of distributed processing."

As MIS departments devote more CPU cycles to friendly interfaces, he argued, the demand for more CPU cycles will exceed the annual rate of 30% at which the cost of the CPU is decreasing.

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# Show Pushes Office Automation In Drive for Increased Efficiency

**By Robert Batt**
CW West Coast Bureau

SAN FRANCISCO — The use of office automation in the drive to increase efficiency was one of the major themes of Hewlett-Packard Co.'s Productivity '82 show lauched here recently.

Personal computing solutions, interactive office applications and small business computers were among the areas covered in the exhibit display areas.

In addition, one of the nine seminars held during the show was devoted to office automation technology.

Pat Wilcox, office systems specialist at HP's Interactive Office Group, told the seminar that the '80s would see a greater need for quality and reliability in the office than had been evident so far.

"The workstations of the 1970s were dedicated to single tasks. The workstations of this decade will need to be true multistation devices. There will be a need to close the gap between what was available in the 1970s and what will be demanded in the '80s," she said.

Wilcox said that organizations would be presented with a series of challenges in the next few years related to increasing productivity. These would include how to deal with a paperwork explosion, the need for personalized services and also more off-the-shelf solutions.

"Labor costs are going up dramatically. They are going to double in the next decade. We need to give office workers the tools to do their jobs even better."

Users, she said, will need to be able to do independent but concurrent jobs from each workstation. They will also need to be able to do several jobs from a single workstation.

Wilcox named four functional areas that needed to be addressed by office systems: document management, the traditional arena of word processing; decision support tools, to enable better decision making; time management tools such as desk aids and personal computers for the business professional; and document distribution, so that information could be routed via a network. This last category would include areas such as teleconferencing and electronic mail.

"Users will be at the center of the interactive office. They will need to be able to perform any of these functions through multifunction workstations."

Although the recent CW DP Budget Survey [CW, Dec. 28/Jan. 4] showed there was a monumental lack of interest among DPers in local-area networks, Wilcox claimed they would be an essential ingredient in the evolution of the office.

"Seventy percent of all communications take place within a one-mile radius. Therefore, local network support will be vital." She added that HP will be developing products that support the IEEE standard for local networks, published late last year.

Wilcox said that as office automation infiltrates organizations throughout the '80s it will result in increased efficiency and effectiveness on the part of employees. This will mean not only lower costs and improved productivity for the companies, but also more job satisfaction for the office worker.

Office technology will result in greater task control, she said, leaving more time for decision making as menial tasks are more rapidly taken care of.

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# Computers Assisting NBS Quest For Model to Prevent Future Fires

BOSTON — Computers may not be able to put out fires, but researchers working at several universities and at the National Bureau of Standards (NBS) are currently testing computer modeling techniques that may provide some help with fire prevention.

Models can be used to answer many fire-related questions including how material burns, at what point a room becomes engulfed in flames, how intense a fire has to be before the fire alarm goes off and how fast a fire spreads.

However, while scientists hope that computer models can eventually be used to prevent or help fight actual fires, research is limited to the laboratory for now. Dr. James G. Quintiere, head of the fire modeling group at the NBS Center for Fire Research, has been working in conjunction with several universities including Harvard University, the University of Notre Dame and the University of California at Berkeley to prepare fire simulation models.

## Variables Important

So far, the fire models developed have not directly corresponded to how materials burn in the real world. That lack of correspondence is caused by a lack of sophistication on the part of the models, Quintiere explained. A tremendous number of variables comprise a fire. The physical makeup of the air, the type of furnishings and the construction materials used in the building can influence where and how quickly a fire can spread. The more detailed that information, the better the model will reflect a real-life situation, Quintiere said.

Some fire models examine a single-room situation. If a chair was to catch fire, the impact would be more intense in an average office, for example, than in an auditorium. Those models, Quintiere noted, can help designers to determine the best ventilation for a room and to select the right types of material to use in furnishings.

Another type of model analyzes how fires spread, he continued. These models can analyze multiple rooms and, in some cases, an entire floor plan. Called field models, these simulations are limited at this point to a two-dimensional capability evaluating height and width. They do not currently include depth, he said.

Field models can be utilized to help devise evacuation paths for inhabitants of a building and as an aid to firefighters in predicting into which area of a building a fire is most likely to spread.

## Other Models

In addition to the room simulations, other fire models are being used to explore the spread of fires in airplane cabins and to evaluate how objects made out of variable materials burn.

But Quintiere warned that the technology behind fire models has not progressed to a point where a model can be used by firefighters in a real-life situation. While that idea is not impossible, its implementation lies in the future, he said.

Fire simulations can also be useful in building design, he noted. For example, a fire can first be simulated in a room with a 10-foot ceiling and then simulated in the same room with a 12-foot ceiling. The two simulations can be compared to determine what effect the two ceiling heights might have on a fire in that room.

This type of research is a relatively expensive proposition. The NBS estimates that a full-size room fire test evaluating temperature, gas flow and object behavior data can cost up to $30,000.

But the critical factor is to ensure that rooms can be evacuated before the fire reaches a critical point where heat and toxic gases become life-threatening, according to the researchers working with these models.

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# *Police Trainee Uses System, Blows Whistle on Own Car*

TAMPA, Fla. — Checking the car she had received as a gift on the police department's computerized system to identify stolen vehicles, a police dispatcher trainee here recently learned it had been a real steal. Literally.

Dianne Reeves was practicing using the computerized system by entering the vehicle identification number of her own car, a 1974 Mustang, which she and her husband had received from her father-in-law three weeks earlier.

The message that appeared on the Kustom Data Communications, Inc. soft-copy terminal was "NCIC [National Crime Information Center] Reply, (Vehicle Identification Number), Wanted, Stolen Vehicle, 1974 Mustang, 2 Dr., yellow and black, Chattanooga, Tenn. Police Department."

Reeves was using the terminal to access the NCIC, which the police use to gain information about cars and other vehicles reported stolen nationwide. As a police dispatcher, she also is being trained to access the Florida Crime Information Center (FCIC), a statewide data base of stolen vehicle reports.

Any time a police unit stops a vehicle and wants to check the car and driver, the police officers radio in the vehicle identification number, the driver's license number and tag. The police dispatcher then enters this data into the terminal and runs a check through either FCIC, NCIC or both.

Reeves said her instructor had advised her to use the system whenever it was free to gain experience and speed, which would help her to respond quickly to officers' requests. That was how she happened to be checking her own vehicle.

After learning her car was listed as stolen, Reeves ran the vehicle number through the system four times, but each time the result was the same. Since she had been with the department only three weeks, Reeves was concerned about her predicament. She notified a training officer, who confirmed the situation and set the wheels into motion that eventually led to the car being returned to its owner in Chattanooga.

The officers she works with had to impound Reeves' car, which her father-in-law had purchased from a used car lot in Alabama. Apparently, it was one of 30 cars that an individual had stolen in Chattanooga.

Unfortunately for Reeves and her husband, the car's owner had not been covered by insurance, so he wanted the car returned. Her father-in-law got his money back.

There have been no repercussions for Reeves or her father-in-law because they were unaware that the car had been stolen. She said her job has not been affected.

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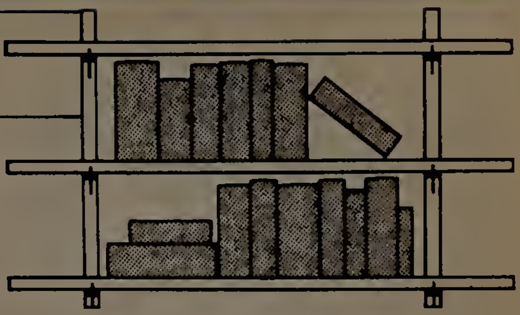

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*All inquiries for further information about the books should be directed to the publishers.*

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Feb. 8-10, Dallas — **Network Protocols.** Contact: The American Institute for Professional Education, Carnegie Building, 100 Kings Road, Madison, N.J. 07940.

Feb. 8-10, New York — **Introduction to Word Processing: Concepts, Systems and Applications.** Contact: Datapro Research Corp., Seminar Department, 1805 Underwood Blvd., Delran, N.J. 08075.

Feb. 8-10, New York — **Basic: An Introduction to Computer Programming for Managers.** Contact: Datapro Research Corp., Seminar Department, 1805 Underwood Blvd., Delran, N.J. 08075.

Feb. 8-10, Washington, D.C. — **Data Base Management Systems: A Comparative Analysis of General-Purpose Systems.** Contact: Datapro Research Corp., Seminar Department, 1805 Underwood Blvd., Delran, N.J. 08075.

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Feb. 8-10, Boston — **Project Management and Control.** Contact: Priscilla Goudreault, Education Coordinator, Q.E.D. Information Sciences, Inc., 180 Linden St., P.O. Box 181, Wellesley, Mass. 02181.

Feb. 8-10, Denver — **Local Area Networks.** Contact: The American Institute for Professsional Education, Carnegie Building, 100 Kings Road, Madison, N.J. 07940.

Feb. 8-10, Boston — **Fundamentals of Data Processing for the Non-Data Processing Executive.** Contact: American Management Associations, 135 W. 50th St., New York, N.Y. 10020. Also being held Feb. 8-10 in Richmond, Va.

Feb. 8-11, San Francisco — **Long-Range Information Systems Planning.** Contact: American Management Association, 135 W. 50th St., New York, N.Y. 10020.

Feb. 8-11, Philadelphia — **Structured Programming: Techniques for Productivity.** Contact: Priscilla Goudreault, Education Coordinator, Q.E.D. Information Sciences, Inc., 180 Linden St., P.O. Box 181, Wellesley, Mass. 02181.

Feb. 8-11, New York — **OS/MVS Cobol Debugging.** Contact: Ellen Garfield, Software Education Corp., 1114 Ave. of the Americas, New York, N.Y. 10036.

Feb. 8-12, San Francisco — **Structured Systems Design/Structured Program Design Combined Course.** Contact: Jim Highsmith, Ken Orr and Associates, Inc., 715 E. 8th, Topeka, Kan. 66607. Also being held Feb. 8-12 in St. Paul, Minn.

Feb. 8-12, Chicago — **CICS/VSD Command Level Programming.** Contact: Director, Educational Services Division, National Software Enterprises, Inc., 310 W. Lake St., Elmhurst, Ill. 60126.

Feb. 8-12, San Francisco — **Structured Design and Structured Programming Workshop.** Contact: Dr. Ned Chapin, Infosci, Inc., Box 7117, Menlo Park, Calif. 94025.

Feb. 8-12, San Francisco — **Structured Analysis Workshop.** Contact: Structured Methods, Inc., 7 W. 18th St., New York, N.Y. 10011. Also being held Feb. 8-12 in Richmond, Va.

Feb. 8-12, Cleveland — **Structured Design/Programming Workshop.** Contact: Structured Methods, Inc., 7 W. 18th St., New York, N.Y. 10011.

Feb. 9-11, Indianapolis — **ACM Tenth Annual Computer Science Conference.** Contact: Association for Computing Machinery, 1133 Ave. of the Americas, New York, N.Y. 10036.

# Free Brochures

- A guide to assist executives in purchasing their first automated information systems has been published by Clapp & Poliak, Inc. The brochure is called "How to Buy That First Computer or Word Processor" and includes sections on legal issues, design specifications, things to be wary of and more. It is a companion to "An Introduction to Information Management," which is also available at no cost from Clapp & Poliak at 245 Park Ave., New York, N.Y. 10167.
- "The Role of the Information Science Community in a National Network" is a 16-page booklet put out by the American Society for Information Science (Asis) in cooperation with Knowledge Industry Publications, Inc. The text is composed of five Asis papers on research, development, maintenance, education/training and design. Copies of the booklet can be obtained from Asis at 1010 16th St., N.W., Washington, D.C. 20036.
- "The Harvard Newsletter on Computer Graphics" has been produced by the Laboratory for Computer Graphics at Harvard University to provide information on graphics software, systems and services. It is available to those who send a self-addressed, 37-cent stamped envelope to Bia CG Guide, Harvard Newsletter on Computer Graphics, Service Department, P.O. Box 89, Sudbury, Mass. 01776.
- The first software referral catalog for Digital Equipment Corp. Decsystem-10 and Decsystem-20 mainframe users has been published by DEC. The 368-page catalog is divided into commercially available packages and those available to the Digital Equipment Users Society. The text can be obtained from DEC, Large Computer Group/Software Referral Catalog, 1 Iron Way, Marlboro, Mass. 01752.

# Call For Papers

FIRST INTERNATIONAL INFORMATION CONFERENCE IN EGYPT,. Cairo, Egypt, Dec. 13-15.

This conference is being cohosted by the Egyptian Society for Information Technology and the American Society for Information Science. It will examine the needs, components and priorities of the "informatization" of modern society, in both developing and developed countries.

Topics and brief abstracts are due by March 31. Further details can be obtained from Dr. B. El-Hadidy, Esit/Asis conference cochairman, Graduate School of Library and Information Science, The Catholic University of America, Washington, D.C. 20064.

# NY DP Exhibit Slated for April

NEW YORK — The New York Computer Show and Office Equipment Exposition will be held here April 22-25. The event is being sponsored by National Computer Shows.

Featured will be mini and microcomputers for business, education, government, industry and personal use, including data and word processing equipment, office machines, computer peripherals and general office supplies.

Admission to the exhibit floor costs $5 for adults and $3 for children under 10. Additional information is available from National Computer Shows at 824 Boylston St., Chestnut Hill, Mass. 02167.

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# Courting Disaster Unnecessarily?

## Turnaround Time
### By Larry E. Long

**Q We are working closely with an established software vendor to implement a package that has been successfully implemented in 20 similar institutions. Since certain procedures must remain intact, we have contracted the vendor to modify the package to meet our requirements. In this joint venture, we have met every milestone and the vendor has not, but our technical people assure me that if everything goes right, the system will be up on time. We must be ready by a certain date or wait another year.**

**Our initial schedule allotted 12 weeks for data conversion and parallel operation. Missed milestones have reduced that to six. Twelve was tight, and six may be impossible. Our advisory committee has mandated the software changes and is measuring our progress against those institutions that installed the package as is. How can we convince them that we're in serious trouble?**

A You are unnecessarily courting a confrontation with disaster. I would suggest that you convene those interested and affected persons and identify intermediate milestones at one-week intervals. Based on information available, a go, no-go decision should be made at each milestone. In your situation, a doomed project pressed to an untimely completion is a waste of valuable resources.

**Q I have a Master's degree in sociology and am currently employed in a human services organization. Given the present political and economic climate, career opportunities in the public sector are not very promising.**

**I am presently taking courses in computer science, which are part of a certificate program at a local university. More recently I have become very interested in obtaining an MBA degree. Even though the MBA degree has lost a bit of its luster, I feel that both fields offer ample opportunities.**

**Would it be better career-wise to obtain an MBA or finish the requirements for a certificate in data processing? Or would it be better to start a career in DP now with the intention of seeking an MBA degree on a part-time basis later?**

A An MBA may provide an entree into the data processing/information systems profession, but your choices are limited to those companies with substantial in-house educational programs. Although you may be required to take some background courses, you might consider a master's degree in computer science or information systems. If you opt for a computer science degree, I would suggest that you take your elective courses in the area of business administration.

Given your level of formal education and willingness to pursue a master's degree, I would eliminate the certificate program as an option.

Should you elect a career in data processing, you will follow an army of social scientists with advanced degrees who have made a successful transition.

**Q I have been working as a data manager in psychiatric research for 1½ years and am very good at it. I have run analyses primarily with packaged programs and have some knowledge of Fortran. I am expecting a baby and would like to continue working from my house. My employer told me it would get a terminal for me, but because of federal government budget cuts, that now seems unlikely.**

**I am aware that many companies not only offer, but encourage people to work from their homes; my problem is locating a firm that would be interested in my skills.**

A Although I believe the "at-house" programmer will ultimately become widely accepted, only a small percentage of companies presently encourage programmers to work from their homes. In addition, although your skills are noteworthy, they are not substantial enough to merit special concessions, like at-house programming. Your skills and circumstances limit you to a small segment of the programmer market. In order to improve your marketability, I would suggest learning Cobol and acquiring some knowledge of systems design. Couple these skills with your experience and you would have a reasonable chance of finding employment at home through conventional channels.

---

*Long is a professor at Lehigh University, a DP consultant and author. If you have a question you'd like him to address, send it to Larry Long, Editorial Department,* Computerworld, *P.O. Box 880, Framingham, Mass. 01701.*

COMMUNICATIONS

**Computerworld Extra! takes a second in-depth look at communications in its first issue in 1982.**

In 1982, *Computerworld* will be producing three issues of our popular "tabazine" publication, *Computerworld Extra!* Each issue will provide in-depth coverage of a single, important topic and we'll be kicking off '82 with another broad and detailed look at data communications.

Communications will ultimately define how computers are used in the 1980's and nothing in the industry will go unaffected by this rapidly changing technology. In "The Changing Technologies of Data Communications," you'll read invited articles by recognized industry experts on these important current topics:

- *Local area networks—what are the options?*
- *What's new in teleconferencing?*
- *Telecommunications—using micro and mini workstations instead of mainframes.*
- *Integrating office automation and data processing.*
- *Who's the new competition for AT&T in the 80's?*
- *What is Bell's strategy for the next decade?*
- *What's the role of dumb and intelligent terminals in the new communication systems?*
- *Video and cable communication in data processing.*
- *Satellites—what are the new communication opportunities?*
- *Packet switching.*
- *Data communications software.*
- *Digital termination systems.*

And for those of you who are consultants, this *CW Extra!* has something extra for you because we're addressing such important management issues as:

- *Local and longhall network management.*
- *Financial data transmission management.*
- *Personnel communication management.*
- *Managing the communication enterprise and coping with government regulations.*

**Computerworld Extra!** will be read by more than 114,000 paid subscribers (ABC 6/30/81) and more than 450,000 pass-along readers (Becker Research Corporation). These readers include the Vice Presidents, Directors, DP Managers, and other MIS professionals who are responsible for the vast majority of all the data processing management/information systems in America. They are the decision makers for nearly $2 billion in annual expenditures on communications, and they rank *Computerworld* as the most useful publication they receive—by more than 4 to 1 (Becker Research Corporation).

**CW Extra!** advertising close is February 5 and we'd be glad to give you more advertising information—as well as complete details on our subscribers and readers. Just contact your local *Computerworld* Sales Office, or, call Frank Collins, Display Advertising Manager, CW Communications/Inc. at (800) 343-6474.

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# FINALLY, AN OFFICE AUTOMATION SYSTEM THAT INTERFACES PERFECTLY WITH THESE MULTIFUNCTIONAL INTERACTIVE UNITS.

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In their eagerness to leap into the Office of the Future, many office automation companies have bypassed an important consideration:

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At Data General, we recognize that no one was ever mystified into greater productivity. Which is why we have designed, from the ground up, the first system that faithfully emulates the office environment—the CEO™ Comprehensive Electronic Office system.

A REVOLUTION WITHOUT PAINFUL CHANGE.

At a time when many are claiming to have changed the shape of the modern office, perhaps the greatest achievement of the CEO system is that it hasn't changed the office at all.

All offices create, revise, communicate, store, retrieve and use information in all its forms to make decisions. CEO systems perform all these functions, electronically instead of manually.

They totally integrate word processing, data processing, electronic mail, electronic filing, administrative support (calendar management, telephone messaging, etc.), and decision support (providing the information necessary to base decisions on).

But what really distinguishes the CEO system is the way it interfaces with the people who use it.

A SYSTEM THAT WORKS THE WAY OFFICE WORKERS WORK.

Executives and professionals spend 80% of their time in various information transactions. CEO can cut these transactions from hours to seconds.

Clerical workers spend considerable time communicating this information. With the CEO system, your people can communicate across workstations, regional offices, even continents, almost instantaneously.

Studies show that office employees are interrupted every 11 minutes. The CEO system has an exclusive "Interrupt" button that allows people to put a given job on hold, attend to something else, and then return to it without disruption. It also offers the world's most merciful "Help" button, which provides simple assistance when needed and in many cases actually anticipates the problem.

The language of CEO is the language of offices, not computerese but words, numbers, and comprehensive office graphics. Phone messages appear on the display screen in the familiar "While You Were Out" forms you're using now. There's even a fastidious electronic janitor who makes his rounds and empties waste from your electronic wastebaskets.

In other words, a CEO system is fully integrated in exactly the sense that offices are. It creates a common information network across all the disciplines of an office, bringing information in readily usable form to those who need it.

AN OFFICE OF THE FUTURE THAT ISN'T PREMATURE.

Office of the Future announcements have lately become almost commonplace, appearing about as frequently as announcements of declining productivity.

Observant readers may have noted certain interesting disclaimers ("This function expected to be ready late in '82.")—or that some new offerings are repackagings rather than new designs.

CEO is a system designed totally from the ground up and available now—one with international service and support capability already in place. It is a product of literally years of research resulting in the improbable:

A system that makes the difficult adjustment to human beings, instead of the other way around.

For more information about it, just write "CEO" 1, Data General, 4400 Computer Dr., Westboro, Massachusetts 01580.

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WE ENGINEERED THE ANXIETY OUT OF COMPUTERS.

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# EDITORIALS

## Will Losers Be Users?

Who won U.S. vs. AT&T, the antitrust battle of the century? The dust is settling on the battlefield, but the losers may turn out to be this nation's business and institutional communications users.

At the time AT&T and Justice Department attorneys were settling their dispute, a bill was pending in the House of Representatives that addressed in a new and more rational way a number of basic telecommunications policy issues — issues such as access charges, terminal equipment depreciation, network access and how to determine when a particular market sector is ripe for deregulation. Bell and its antagonists have been fighting over some of these matters since 1968.

H.R. 5158 wasn't perfect — it relied too much on the Federal Communications Commission, for example — but it protected telecommunications users against the abuses of monopoly power much more effectively than S. 898, the bill passed by the Senate to replace the Communications Act of 1934.

AT&T didn't like the House bill and indicated as much in a public statement shortly after it was unveiled. So the company, as in 1956, worked out a settlement with the Justice Department. This time, however, the situation was radically different.

New technology was rearing up everywhere; electronic mailbox services, digital wideband local loops, satellites and videotex were just some of the harbingers of change. What all this signified was summed up neatly by AT&T in a national newspaper ad it published shortly after announcement of the settlement. In the ad, AT&T said divestiture "had to be now" because the company couldn't tolerate "further delays in bringing new technology to market."

In short, Bell was on the spot — one of the few times in its history that has happened. There was a golden opportunity to take advantage of the situation.

Assistant Attorney General William Baxter did manage to wring a few concessions from AT&T, but he could have gained many more by hanging tough. He could have, for example, insisted on equal network access for all users of local exchange facilities, not just long-distance communications carriers. He might have insisted that Bell operating companies, after divestiture, not be allowed to aggregate their requirements for circuit and communications hardware, thus making the Long Lines Division and Western Electric the most economical suppliers of these items despite what the settlement said about the operating companies not favoring AT&T over competing suppliers.

In short, Baxter fumbled on the one-yard line and Bell ended up with the touchdown. We can't help wondering whether the assistant attorney general dropped the ball on his own or whether it was a deliberate play called by the team captain.

## What Happens Now?

The IBM trial has ended. The miles of court documents and testimony from countless witnesses are now history. Antitrust legislation may never be the same; but what happens to the computer industry? IBM users said that ending the trial means very little to them. Some vendors are uneasy.

One thing is certain. Thanks to the settlement, IBM is going into 1982 a more confident company. But what about users — are they facing the same situation that confronted DP departments in 1969?

Thirteen years is a long time. Back in the days when IBM and a handful of other hardware vendors were building mainframe processors and trying to sell the world on computerization, the government was justified in questioning IBM's business practices.

Things are different now. The computer industry has exploded and the handful of vendors has grown into a crowd. Computers come in so many sizes and configurations that the real problem is keeping track of new developments.

IBM is still the major force in the U.S. computer industry. It is the trendsetter, the company with a $2 billion research and development budget. But it's no longer the only show in town. Unlike 1969, users today can choose from a wide variety of systems offered by many vendors.

That is today's scenario. What will happen tomorrow? Some observers speculate that the Justice Department, in dropping the antitrust suit, is giving IBM implicit permission to become an unfettered aggressor in the computer industry.

Can IBM force some companies out of business by becoming more competitive? Definitely. But is that bad for users? Not necessarily. William H. Baxter, the Assistant Attorney General who spent six months reviewing the antitrust suit prior to its dismissal, said that "competitive markets produce companies of the right size."

Will users once again be backed into a corner where they must buy IBM and only IBM? The general feeling within the industry is that while theoretically possible, this is realistically improbable. What counts is what happens, not what could happen.

The Reagan administration has put the stamp of approval on big business. "I have no reason to believe IBM has not been a good corporate citizen," Baxter maintained.

And, in the spirit of Reaganomics, ending the IBM trial saves a lot of money. The government estimates it spent between $1 million and $2 million each year to prosecute the IBM case (a total of about $26 million). IBM is maintaining a corporate silence about what it has cost the company to fight the suit, but any reasonable estimate would be in the multimillion-dollar range.

Whether the decision to end the 13-year battle will awaken a sleeping giant or simply bury a dead issue remains to be seen.

# DATA PAST

### Five Years Ago
### Jan. 19, 1972

LOS ANGELES — Court observers asked who hired the shadow jury, but so far there was no answer.

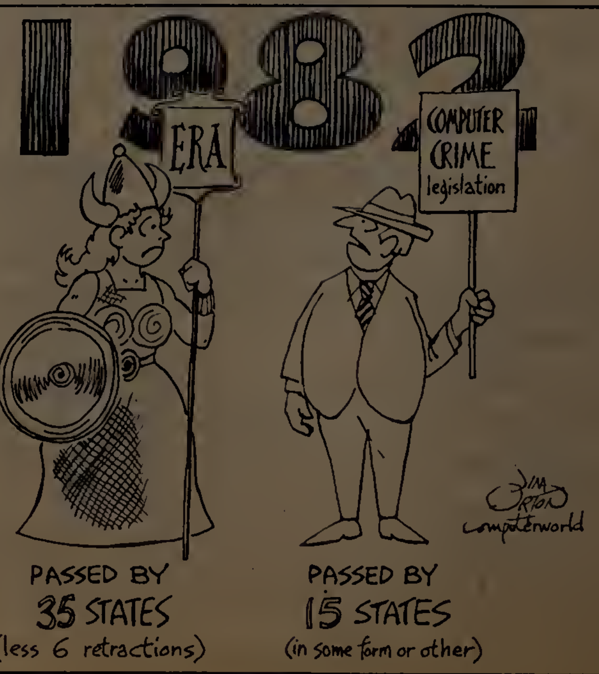
Six people faithfully attended only those portions of California Computer Products, Inc.'s antitrust suit open to the jury, and they appeared to be a shadow jury.

A shadow jury would presumably have been asked to render a "verdict" at the trial's conclusion, giving attorneys some feeling for how and why the verdict was reached.

### Ten Years Ago
### Jan. 24, 1977

WASHINGTON, D.C. — Direct Federal Communications Commission (FCC) intervention in AT&T's interconnection policies came one step closer last week when the phone company rejected a commission request to modify its tariff requirements.

The Independent Data Communications Manufacturers Association told the FCC that Bell's interconnection policies were discriminatory policies.


1982
ERA
COMPUTER CRIME legislation
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PASSED BY 35 STATES (less 6 retractions)
PASSED BY 15 STATES (in some form or other)

**SOFTLINE** / Werner L. Frank

# Computerese and Communications Confusion

Computerese, the lexicon of computer professionals, sometimes employs strange terminology. A layman or newcomer to the industry could well be confused by it.

As an example, consider the term "time-sharing." In the early '60s when the term was first introduced, it was often confused with competing expressions such as parallel processing and multiprocessing.

In any event, the operation described by the term time-sharing was not the sharing of time, but the sharing of space. Typically only one computer function for one user can be operable in any one segment of time, at least as it relates to the CPU.

Today we are not bothered by this anomaly. Time-sharing is a well-known expression, understood to represent the simultaneous cooperative use of a computer by a number of on-line users that alternately share the resources of a data processing system. The term has lost its intrinsic meaning and now represents a type of service whose quality and characteristics are generally understood.

This observation leads us to look at other contemporary terminology and to comment on some current use, or misuse, of the English language as applied to data processing.

Consider first the popular designation OEM, which is an acronym for original equipment manufacturer. Why do we designate a company that serves as a distributor for a manufacturer an OEM? If anything, such as company operates on behalf of an original equipment manufacturer, but certainly is not the OEM itself. Yet the term has grown to mean exactly the opposite of what the words seem to convey.

Another acronym, RAM, also deserves a challenge. This is a ubiquitous term for a ubiquitous device and is usually explained as meaning random-access memory. RAM is actually the designator of that portion of computer memory that has the property of read/write facility as opposed to ROM, which correctly means read-only memory.

Yet all computer memory, whether RAM or ROM, is random access. Hence the RAM designation seems not only inappropriate but also misleading. It might better be known as RWM (read-write memory); but how would you pronounce this?

### Virtual and Transparent

Two very popular terms in today's computer vocabulary are "virtual" and "transparent." How do you interpret the following sentence? "The virtual system is transparent to the user." Does this mean that an informally acknowledged system can be seen through? Let's examine each of these terms independently.

As far as I can determine, the term "virtual," when used in conjunction with "memory system," is reserved for. describing a computer system that has the capacity of an expanded memory manifested in some form of high-speed storage.

The virtual aspect of this memory is a technical feature. This allows automatic sequential addressing to be handled by the system regardless of whether or not the information is located in "real" memory or in the extended memory contained on some storage device external to the CPU memory. It is this extended memory capability that is given the label of virtual memory system.

But what does the dictionary tell us about the word virtual? *Webster's New Collegiate Dictionary* defines it as "being such in essence or effect though not formally recognized or admitted — a virtual dictator, a virtual promise." Indeed, storage that has the appearance of memory fulfills the definition.

```
(1) List the name if the age is greater than 50.
(2) If the age is greater than 50, list the name.
(3) IF AGE > 50 THEN PRINT NAME
(4) 200     LD    A      Load accumulator with Age (=A)
            SU    B      Subtract 50 (=B)
            JP    300    Transfer to 300 if Accumulator is positive
            J     100    Transfer to 100 for next record

    300     SB    N      Subroutine to Print Name (=N)
            J     100    Transfer to 100 for next record
```

**Figure 1**

But we have allowed ourselves to take liberties with the meaning, as shown in the following contemporary sentence extracted from a trade journal: "IMS ran in expensive real core memory . . . rather than in virtual storage." Storage is, of course, as real as is memory; it is their combination that can produce a virtual memory system.

This brings us to the term "transparent," which has several nuances of meaning defined by *Webster's* as follows:

- Having the property of transmitting light without appreciable scattering so that bodies lying beyond are entirely visible: pellucid.
- Easily detected or seen through: obvious.
- Readily understood: clear.

But how do we use the term transparent when we speak computerese? We say that the physical structure of the data is transparent to the user or that the way the computer solves a particular problem is transparent to the terminal user's communications dialogue.

In both of these cases, we do not intend the dictionary meaning of "being visible" nor "easy detection" nor "readily understood." Instead, we imply the meaning that the designated process is hidden or unnecessary for comprehension. This is an exact semantic opposite!

The word that gets the grand prize for use and misuse is "syntax." The advocate of a particular computer language will necessarily claim that "its syntax is the best" or "the syntax is user-friendly" or "the syntax is nonprocedural" and so on.

The word syntax, in this context, is used to make claims for language form, structure, grammar, meaning, semantics, vocabulary and anything else that can describe language. The language purist will, of course, wish to limit the applicability of the term syntax to "sentence structure," which, with respect to language, means the form taken by the medium of expression as exhibited through sentence diagramming.

Figure 1 provides an example of four typical and equivalent operations directed to a personnel file.

The four examples illustrate two variations of English-like query statements, a formulation that reflects a statement from a Basic language program and a piece of Assembler code showing a snapshot of algorithmic logic.

*(Continued on Page 34)*

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**SOCIOLOGY OF COMPUTING** / Robert L. Glass

# The Ultimate Buzzword Seminar

Psst! Come over here a minute.

I want to share with you a can't-lose, sure-fire, get-rich-quick scheme for making a fortune in computing.

Why do I want to share it with you? Why don't I keep this idea to myself? Because the idea is too outrageous, too crazy, too . . . too . . . *unethical* for me to ever use it. Still interested? Well, here it is.

It is well known that computing spawns buzzwords. We've all been distributed and networked and structured and prototyped and productivityized well past our tolerance levels, right?

And probably most of us have seen the idea of the buzzword generator — a computer program that puts together computing syllables and phrases in new ways and generates new buzzwords as a result.

Now here's the idea. Suppose we write a buzzword generator program with a really good data base of computing terminology. And suppose we write a buzzword screening program for evaluating the candidate buzzwords against a set of buzzword appropriateness criteria.

And suppose, finally . . . and here's the *real* thrust of the idea . . . we decide to make our fortune — the one we talked about earlier — from giving seminars on computing buzzword topics. Look how many fortunes have already been made off structured seminars in the '70s and productivity seminars in the '80s.

All we have to do is run the buzzword generator program for about five minutes, run the buzzword screener against the output and — voila — we have a list of seminar topics to choose from. Grabbers like these:

- Packaging and Selling the Software Bug.
- I Made $100 in Software Consulting.
- Egoless Management: The "I Don't Care" Method.
- Overcoming Error-Free Software.
- Successful Acceptance Testing Through Phony Data Selection.
- Software Can Make Your Computer a Success.
- Tax Shelters for Surplus Personnel.
- The Top-Down Approach to Sexual Gratification.
- A New Recipe for Spaghetti Code.
- Cultivating Errors in Your Software.
- Exception Handling: The Card-Chip Approach.
- The Joy of Prototyping.
- Unsafe Conversion Through Vacuous Code.
- Reliability: The Optional Quality Attribute.
- Optimal Efficiency Through Vacuous Code.
- Voice Input and the Hearing Impaired.
- Career Opportunities in War-Torn Countries.
- The Underachiever's Guide to Very Small Business Opportunities.
- Put a Microcomputer in Your Outhouse.

There! Isn't that wonderful? There are enough topics to make all of us rich. And that's from only five minutes of program execution.

Now for those of you who are still reading, I have a little confession to make. That list of seminar topics wasn't really computer-generated. It evolved from the folklore of another discipline.

And then I have another confession to make. I haven't told you the best seminar topic of all — I'm saving it for my own use.

You really want to know what it is? You promise not to use it yourself? Well, okay then, here it is: Structured Productivity in the 1990s: An End of the Century Approach.

Talk about building on the successes of the past! This is a can't-lose, sure-fire, get-rich-quick scheme for making a fortune in computing . . . just what I promised at the beginning of this story.

But remember — you promised not to use it!

# Is Computerese Causing Confusion?

*(Continued from Page 33)*

Many people in the computer field would categorize each of these alternatives with a different syntax. The first two, for example, although sharing the same basic structure, reverse the position of the conditional clause. The third approach is a coded shorthand and the last entry is an ordered presentation where position is everything.

Actually, the syntax of the first three statements is equivalent since all three can be diagrammed in the same manner. The fourth approach is not only a different syntax, but also a different language. Strangely enough, since all four formulations direct the computer to do the same thing, we can conclude that their meanings are identical: Putting it in linguistic terms, they possess equivalent semantics.

### Personal Computer

This brings us to the most current of hot buzzwords in the vocabulary of the computer culture. This is the term "personal computer."

Approximately five years ago, the personal computer emerged along with related terminology such as hobby computer and home computer.

Today the adjective "personal" has survived and gained substantial acceptance. Its use was even dignified when IBM gave that appellation to its most recently announced new computer product at the lowest end of its line.

What can be personal about a computer? Can a computer have any greater affinity for an individual than, say, a typewriter does for a clerk or a secretary?

Indeed, the very meaning of the term personal suggests that the item should be limited in use and availability to a specific individual. Surely this is not a notion most organizations would wish to associate with any of their assets.

I do not believe that the term personal computer can or should survive. Can you imagine a doctor, lawyer or plumber wishing to acquire a small-business system inquiring about the purchase of a personal computer? I prefer a name such as desktop computer or even a new term, such as professional computer.

The wide use of the words "input" and "interface" is one example of the way computerese is beginning to affect the language of the general public. The increasing importance of computers in our society will surely accelerate further transfer of terminology from computer professionals to common speech.

From an industry that specializes in precision, one would expect a comparable discipline in communications. The computer industry can do a better job than it is doing now in improving and formalizing its jargon.

*Frank is executive vice-president of Informatics, Inc. in Woodland Hills, Calif.*

# LETTERS

## Behavioral Skills

"DPers Advised to Cultivate Behavioral Skills" [CW, Dec. 14] identifies a key problem in corporate organizations in general and the DP environment in specific.

Very few organizations have recognized the vital nature of behavioral management — also known as human resources development and planning — within the organization.

I hope that in the coming year more companies and groups will recognize those key skills pointed out in the article and others.

Thank you for putting this critical issue to the attention of your readers in a way that those of us involved in behavioral skills management and training can rarely achieve.

Steven D. Sass
Vice-President,
Management Systems
Advanced Resource
Development Corp.
Columbia, Md.

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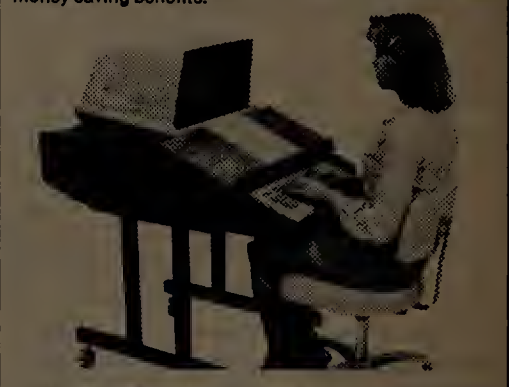

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# LETTERS

## Missing Vendor

I am writing in response to the article "Rush to Local Nets at Fever Pitch" [CW, Dec. 14]. I realize that you could not list every vendor of local networks, but I believe that you left out a very important vendor in this area — and that vendor is Tandem Computers, Inc.

You mentioned "The vendors . . . are by no means the only ones selling local nets. In some cases, they are market leaders; in others, new contenders. However, these firms represent a cross-section of industry offerings."

I challenge you to find in the list one company that offers a fault-tolerant network. Your list was quite lacking if vendors in this area were mentioned.

Tandem has a local network (if you call worldwide "local") that works and works well. Tandem can string an incredible number of processors (more than 4,000) together to make it look like one system — all without any reprogramming. Tandem has gone to great lengths to create a network that is easy to access, to maintain and to remain fault-tolerant.

By leaving Tandem out of your comparison of vendors offering local networks, you have done an injustice to Tandem and to readers who read your newspaper for insight into what vendors are offering on the market.

I would suggest that from now on you investigate software on the market before you print an article that is out-of-date and does not make accurate comparisons.

Darrel VanDyke
Tandem Computers, Inc.
Irving, Texas

## No Justification

I have to take exception to an extremely poor choice of words in the "Turnaround Time" column ["Unjust Cost for Forecasting Model?," CW, Dec. 7]. The response to a question concerning systems development costs states that: "There is justification for padding the estimates of a high-risk project. . ."

There is never a justification for any padding of estimates. If a high-risk project is being undertaken, an assessment of risk ought to be performed and a contingency, as a separate line item, ought to be added to the project estimate. This contingency can then be allocated to the project tasks when and if the uncertainties associated with the project affect the cost.

A separate contingency can be managed and remanded to the corporate treasury upon completion of the project, if not required to address the risks.

Experience has proven that padded estimates become self-fulfilling prophecies. Parkinson received a good deal of attention for making that point. Therefore, padding within the task estimates for the project should always be discouraged.

The most effective project managers will not utilize all of the contingencies allocated to their projects. Average project managers will exhaust their contingencies.

In teaching project management to more than 10,000 participants during the last decade, I have always discouraged the use of padding as a means of dealing with risk. However, senior management must also recognize the need for contingencies and allow the use of such a line item.

Ira Bitz
Ira Bitz & Associates, Ltd.
Chevy Chase, Md.

*Computerworld* welcomes comments from its readers. Preference will be given to typed, double-spaced letters of 150 words or less. Letters should be addressed to Editor, *Computerworld*, Box 880, 375 Cochituate Road, Framingham, Mass. 01701.

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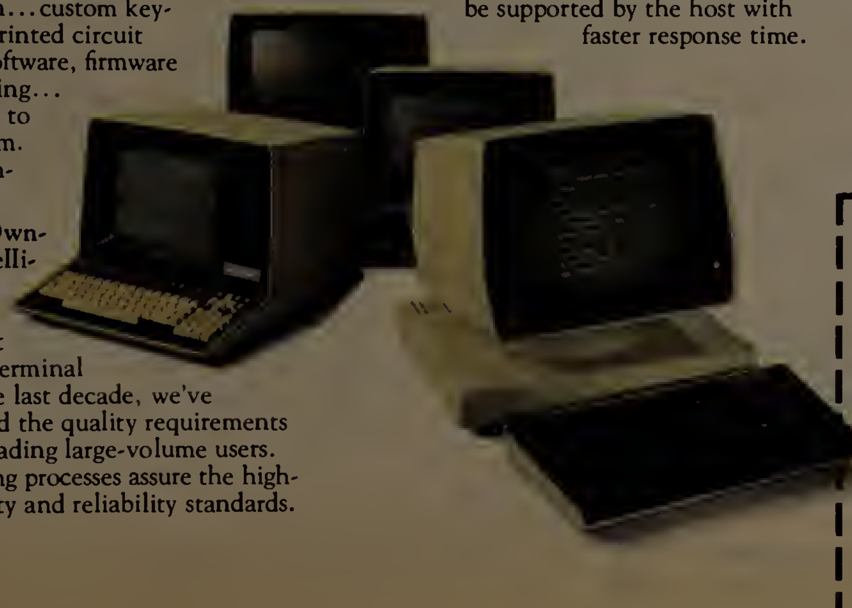

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# LETTERS

## Lack of Understanding

"Stockman Crunching More Than Data?" [CW, Dec. 14] exhibits an embarrassing lack of understanding with respect to the programming of economic models.

While earning a master's degree in economics at Boston College, I had the opportunity to construct dozens of computerized models based on economic theories that sought to describe behavior. Frequently they contradicted each other. This was not because one was "correct" and another was "deceitful"; rather they contradicted each other because the authors of the theories had different ideas on what drives the economy.

An example: If one assumes that a business tax cut will only result in bloated profits due to a supposition of corporate greed, then one's economic model will predict that such a tax cut will only result in more money being hoarded by the rich stockholders.

A computerized model is merely a mathematical description of how a planner feels the economy will react to certain influences. Developing an economic model is more subtle than using a proven payroll program.

Yet this whole discussion is probably of little importance since the percentage of people who actually read and/or believe those computerized printouts on the economy is so close to zero that it's probably insignificant.

Brian J. Sroub
Lucas Machine Division
Litton Industrial Products, Inc.
Cleveland, Ohio

## Ignoring Basic Facts

Jack Stone does not present a compelling case in "Stockman Crunching More Than Data?," [CW, Dec. 14]. He, and possibly William Greider also, seem to be assuming the worst about the motivations of Stockman and his associates while at the same time ignoring some basic facts about computerized economic modeling.

According to Stone and Greider, Stockman and his supply-side cohorts "... discarded orthodox premises of how the economy would have." In so doing, they assumed that double-digit inflation and slow economic growth would not continue, but that inflation and interest rates would decline and that economic growth would increase. By whose definition are double-digit inflation and slow economic growth "orthodox premises?"

In addition, Stone seems to imply that Stockman defaced a sacrosanct model of the economy by modifying "orthodox premises." There is no "correct" model of the economy whose "orthodox premises" can be fraudulently changed to yield desired results. Computer models of the economy range the gamut of economic theory. It seems to me that it is acceptable to modify the assumptions in an economic model that assumes high inflation and slow economic growth.

There certainly is great potential for the type of fraudulent behavior of which Stone accuses Stockman and the accusations may very well be deserved. However, I do not believe a very good case was made in this article.

Michael Aquilino
Montpelier, Vt.

## Balderdash!

Rot! Nonsense! Balderdash! Camille Kostosky's reaction to Charles Verbisky's commentary on programmers' poor communications skills is wrongheaded rationalization ["Programmers Don't Need to Communicate in English," CW, Dec. 7].

Her central point, that programmers need only understand each other and that special "translators" can help them communicate with the outside world, simply pushes a legitimate professional responsibility off onto a fictitious category of people.

Where are these translators supposed to come from?

Computer professionals are in constant communication with those outside their field. That's where the requirements for systems come from and that's where the systems go when the programmers are through with them.

As for only needing to communicate with other programmers, one wonders where these subliterates expect to go in their professional lives. Kostosky seems to assume that programmers stay programmers forever.

The poor syntax, bad spelling and unclear language of the slovenly communicator create work for everyone who comes into contact with him.

The job that should be done once by the creator of a document is instead done every time it is read.

Kostosky's assertion that programmers can communicate adequately with each other in bad English is patently false.

Richard M. Foard
Manager,
Software Tools
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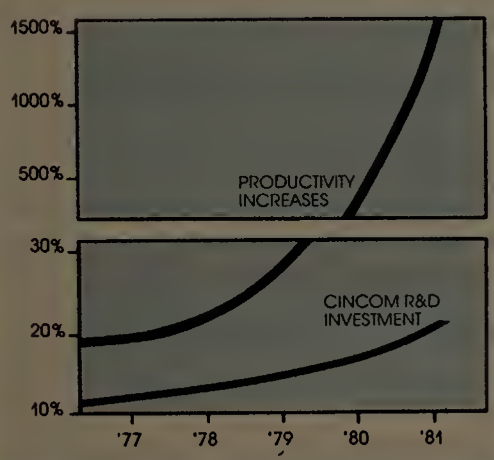

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### *DBMS: Exploring the Issues — Part 1*

# DBMS — Foremost a Consumer Product

*In this three-part series, Holsapple explores the subject of data base management systems (DBMS) — including the pros and cons of various types of DBMS, what actually constitutes a data base and how DBMS packages are used to develop applications systems.*

*The first installment provides a description of the end users' needs in regard to a DBMS. Next week Holsapple will examine the needs of the applications developer.*

By **C.W. Holsapple**
Special to CW

What is the best kind of data base management system (DBMS)?

The issues of hierarchical vs. Codasyl vs. relational often take center stage in discussions, with advocates of each claiming superior properties. Such terms as "user-friendly," "user view," and "natural" are conjured up in an effort to substantiate an advocate's argument.

Discussion about the pros and cons of various DBMS approaches is only meaningful in the light of a clear understanding of who is the user of a DBMS and what is the true role of a DBMS. The purpose of this article is to provide such an understanding as the basis for effectively comparing the various DBMS approaches and to clarify the relationships among end users, application developers, DBMS and application systems.

The term "data base" is used to refer to everything from paper records in a file cabinet to a genuine data base, consisting of an integrated collection of interconnected records organized according to a logical structure in which redundancy can be minimized.

There also are frequent articles that refer to an application system as a data base system, as well as frequent implications that a DBMS should be easy for an end user who is unable or unwilling to spend more than a small amount of time learning about data base management.

End users are often confused with application developers and DBMS are often confused with application systems.

An application system is devised and implemented by an application developer. It allows an end user who is not knowledgeable in programming, data structuring or data-handling methods to store, modify and acquire data that is pertinent to the end user's application area.

It is therefore a consumer product that may be tailor-made to suit a particular end user's needs. Alternatively, it may be a generic consumer product, fitting the needs of a class of customers and being distributed as a ready-made, off-the-shelf package.

In either case, the end user is not concerned with the tools used to build the application system, but with how well the application system meets his needs and how much the product costs.

If existing off-the-shelf application packages do not suit an end user's needs, then their prices are irrelevant and the cost of a tailor-made application system becomes important.

An end user needs an application system that will enable him to store, modify and acquire data without concern about data structures, data handling or programming, that will automatically provide data integrity and data security, that can fit the hardware and software already in place, is portable, provides high performance or efficiency and is extendable.

Finally, the end user desires an application system that meets these criteria as inexpensively as possible.

An off-the-shelf application developer is interested in producing, as inexpensively as possible, an unchanging product that will appeal to a large class of end users.

Since the development cost can be spread over many sales of the application system, the system's price can typically be lower than a roughly comparable application system that has been tailor-made for a single end user.

A tailor-made application developer, on the other hand, is interested in producing, as inexpensively as possible, a product that will appeal to one end user. It is quite likely that this end user will expect the application developer to make alterations to the application package over time. Each kind of application developer could be either in-house or an outside vendor/consultant.

Like any producer of consum-

(Continued on Page 44)

# System 2000 Users Gain Two Aids

## • *'Titus' Replaces DBMS' TSO Interface*

AUSTIN, Texas — A.C.T.S. Corp. here has announced the release of Titus, a software product designed to reduce the time required for users of Intel Systems Corp.'s System 2000 data base management system (DBMS) to complete quest or report writer sessions under IBM's TSO.

Titus reportedly can be used in lieu of the TSO interface provided with the DBMS. It is designed to save previously executed commands and to create multiple virtual activity areas (VAA) to contain output generated during the TSO session.

At any time, previous commands may be recalled, edited and resubmitted by the user, the vendor explained, adding that VAA contents can

(Continued on Page 43)

## • *IBM Users Provided With WHERE Support*

WASHINGTON, D.C. — A software package designed to provide dynamic construction of WHERE clauses for users of IBM versions of the Intel Corp. System 2000 data base management system's (DBMS) Programming Language Extension (Plex) was announced here by Caci, Inc.

Dbaccess reportedly enables the WHERE clause in a LOCATE statement to be changed when data selection conditions change without any program modifications or recompilation. The vendor said it can process any LOCATE statement that is acceptable to a Plex program.

The package is a subroutine that is called from a Plex program anywhere that a LOCATE statement normally would be coded, the vendor ex-

(Continued on Page 43)

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# Enhancements Added to 'Scert II'

ROCKVILLE, Md. — Performance Systems, Inc. has announced an enhanced version of its Scert II performance prediction/capacity planning package.

Added features include support for multiprocessors, paging, MVS service units and internal job/task scheduling schemes, the vendor said.

In addition, the vendor said the Performance Library of Scert II has been expanded to include Amdahl Corp. 470V/5, -V/6, and -V/7 processors, Honeywell, Inc. Series 60 Level 6, Level 66, DPS 8 and Multix systems, Digital Equipment Corp. PDP-11/70 systems, National Advanced Systems, Inc. AS/5000 and AS/7000 systems, IBM System/34, 370/138, 8100 and 3081 processors as well as other vendors' systems, the firm said.

The package, including documentation, costs $49,500, the vendor said.

Performance Systems is located at 30 Courthouse Square, Rockville, Md. 20850.

# 'Titus' Acts As TSO Link

(Continued from Page 41)

be recalled and reviewed, or compared with later reports so that multiple data base access can be coordinated.

Full paging control is available under Titus, according to A.C.T.S., and includes current, previous, first, last and partial page. Column control is said to provide improved page placement of existing output reports. With Titus, a user reportedly can review a DBMS report before deciding whether or not to direct the report to a hard-copy printer.

Titus is designed for all levels of System 2000 users, the vendor said, and includes a Help facility to provide explanations of Titus facilities, commands and error conditions.

The package is priced in the $15,000 range, depending upon the customer's configuration and the amount of maintenance required, the vendor said from 11910 Gate Way, Austin, Texas 78759.

# WHERE Aid Provided

(Continued from Page 41)

plained. The calling program may pass the LOCATE statement to be executed to Dbaccess, or Dbaccess may read the statement from an external file.

Dbaccess is said to check the statement for correct syntax, then build the appropriate System 2000 control blocks and call System 2000. After the DBMS creates the LOCATE file, Dbaccess returns control to the calling program, the vendor said, and this program is responsible for checking the return code and processing the LOCATE file.

Currently existing Cobol or PL/I Plex programs can be converted to use Dbaccess by replacing LOCATE statements with CALL statements to Dbaccess and adding a few lines of code, according to Caci.

Dbaccess is said to be compatible with all IBM versions of System 2000.

Dbaccess is priced between $6,000 and $15,000, depending on options, the vendor said.

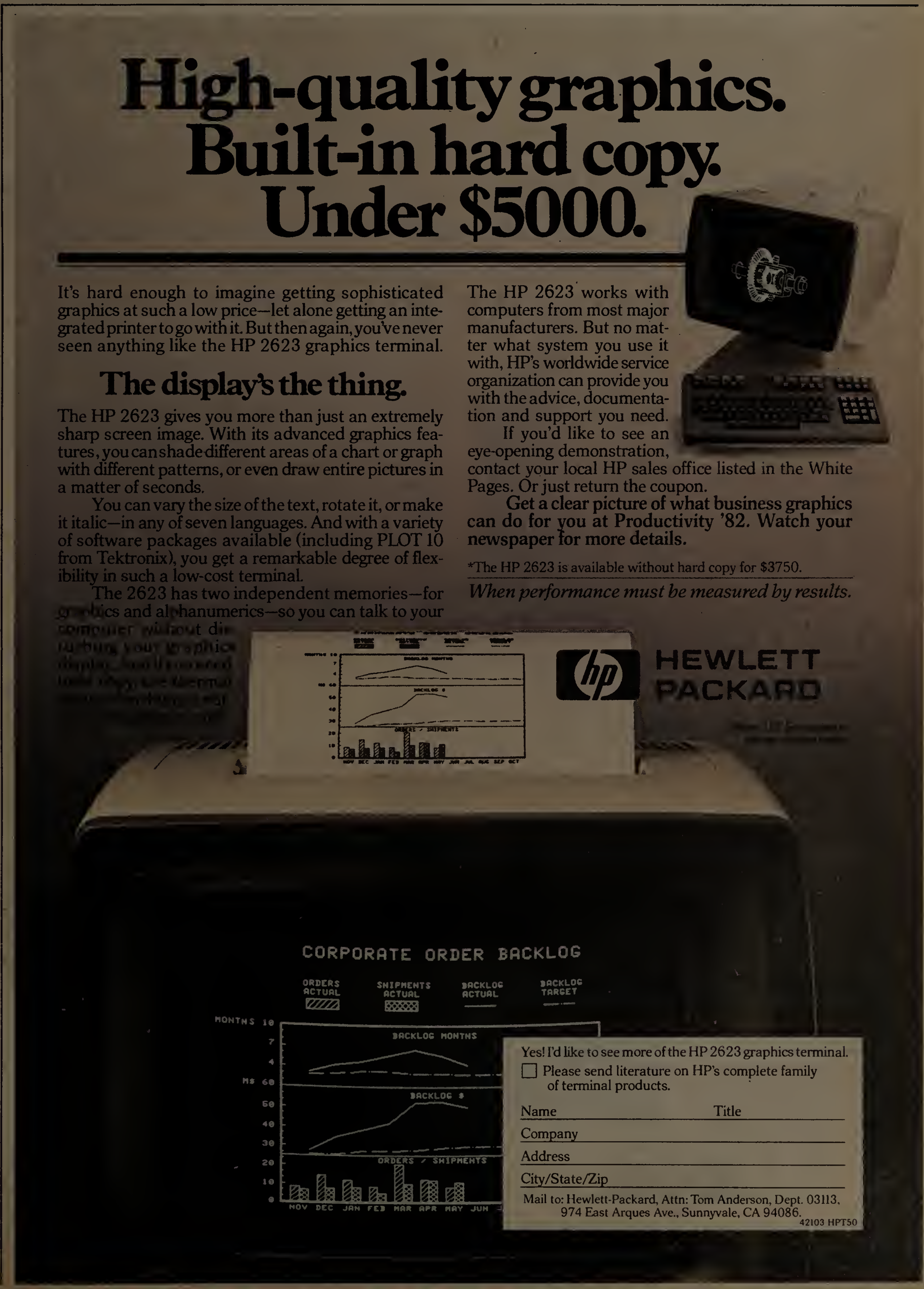
Caci, Inc. is located at 1815 N. Fort Myer Drive, Arlington, Va. 22209.

# *OS/VS Users Get Net Cross-Referencing*

BEVERLY HILLS, Calif. — Allison & Associates Co., data communications consultants, has announced a Network Cross-Reference System

The package is said to allow users of IBM's OS/VS operating system to create a cross-reference between Vtam work devices and IMS and CICS logical terminals. The package will support a maximum of two IMS and two CICS systems, the vendor said.

Up to six different reports are available. The package costs $2,000 for a perpetual lease. The source code is optionally available for $3,000, the vendor said from 256 S. Robertson, Beverly Hills, Calif. 90211.



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## *'Tool Kit' Provides IDMS Utilities*

NAPERVILLE, Ill. — A set of utilities designed to assist users of Cullinane Database Systems, Inc.'s IDMS data base management system on IBM and plug-compatible mainframes was released here by DBMS, Inc.

The IDMS Tool Kit is described by the vendor as a collection of integrated software products designed for management of the data base and data communications environment.

Release 1 of the package includes seven products. The Journal Analyzer was designed for problem solving, audit trail, program testing and detailed performance analysis reporting from the IDMS Archive Journal File. The Log Analyzer reportedly provides performance monitoring and utilization for the IDMS-DB or IDMS-DC environments. Formula/1 is said to provide improved transaction response time for IBM's CICS and IDMS-DC.

The other products in the IDMS Tool Kit are the Database Audit, Schema Mapper, Database Analyzer and Database Reorganization.

The OS version of the IDMS Tool Kit is priced at $15,900. The DOS version costs $13,900, the vendor said from 1801A Mill St., Naperville, Ill. 60540.

## Dylakor Adds Version Of 'DYL-Audit' for CMS

GRANADA HILLS, Calif. — Dylakor, Inc. has introduced a CMS version of its DYL-Audit package that was designed to operate in either free-form English language or fixed-form parameter-driven formats on IBM and plug-compatible mainframes.

DYL-Audit's sampling techniques, frequency distribution, aging analyses, report writing and letter writing functions reportedly use auditor-specified data and criteria to automatically perform the necessary calculations and write reports. It includes manuals that are said to enable the auditor to "walk through" programs and show, step-by-step, how to perform complex auditing functions.

Both fixed- and free-form DYL-Audit allow the auditor to write reports in any format, the vendor said. Its automatic composition feature formats reports to the auditor's specifications, and up to 99 different types of letters, including any amount of variable data, may be generated per pass of the file.

Sampling procedures are said to vary from simple random and interval to complex statistical sampling methods.

Priced at $1,272/year on a three-year lease, DYL-Audit is available for IBM and plug-compatible mainframes running on OS, DOS or CMS. The vendor is at 17418 Chatsworth St., Granada Hills, Calif. 91344.

## DSSI Unveils JCL Prescan

SAN JOSE, Calif. — An on-line JCL Prescan facility has been developed by Diversified Software Systems, Inc. (DSSI).

Prescan is used on-line or as a batch job to verify job streams before they are submitted for execution. Prescan reportedly features an extensive syntax check and a generalized user exit facility.

Prescan costs $3,000 for current Docu/Text-200 users and $8,500 for others. Prescan will run under any version of OS, VS1 or MVS.

Docu/Text-200 is an automated system documentation and analysis product ranging in price from $11,500 to $22,500.

DSSI is based at Suite 205, 996 Minnesota Ave., San Jose, Calif. 95125.

## DBMS: Product For Consumers

*(Continued from Page 41)*

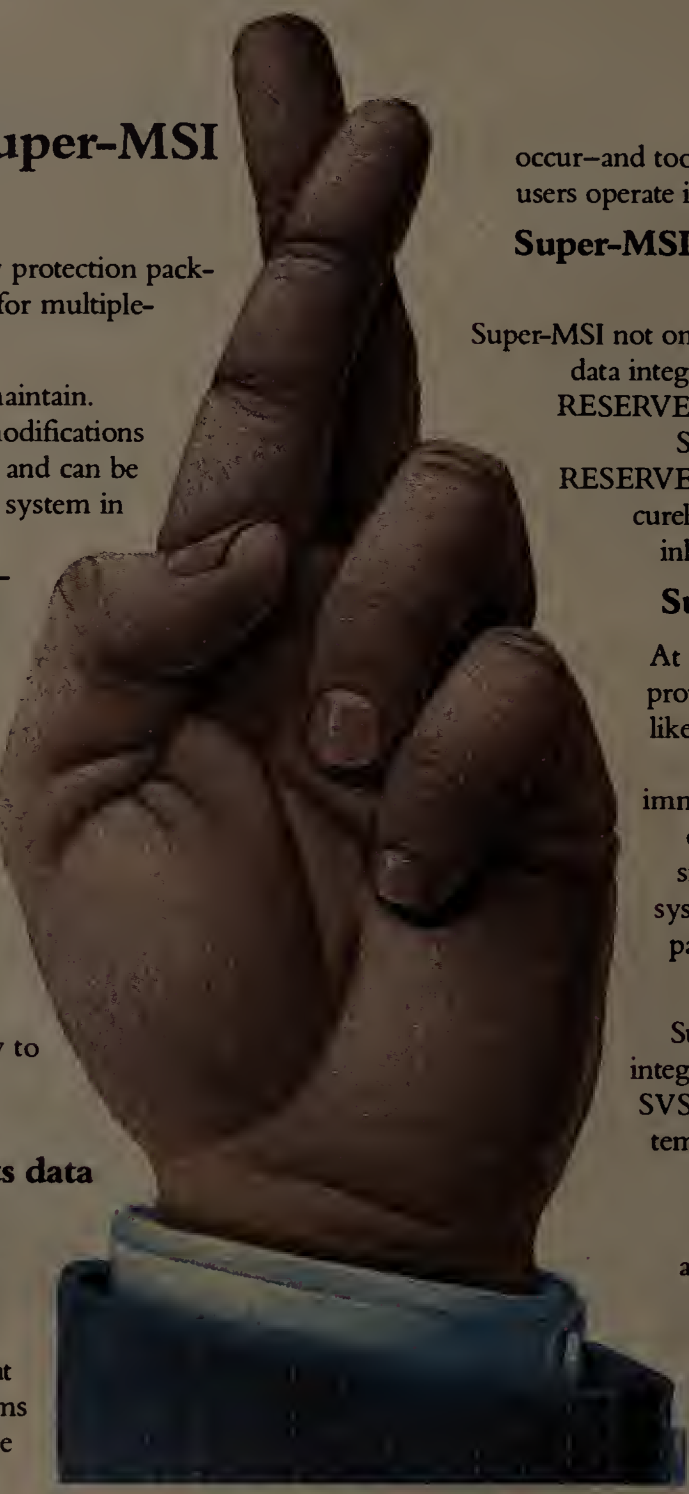
er products, an application developer makes use of tools to aid in the production of application systems. For example, a DBMS is a tool that can be utilized to create application systems.

Just as automobiles are created through the use of machine tools, application systems are built with the aid of application development tools, such as a DBMS. An automobile is not involved with the machine tools that produce it. Similarly, an end user does not interact with a DBMS.

The value of an application development tool can be gauged by the extent to which it satifies the needs of an application developer, while at the same time minimizing the developer's costs.

Keeping in mind the end user's needs noted earlier, the corresponding needs of an application developer can be identified. We'll look at those needs next week.

*Holsapple is associate professor of business administration at the University of Illinois at Champaign. He is presently on leave as visiting associate professor of management and computer science with Purdue University.*



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### Three Standard Applications

# Financial Products Introduced for HP 3000

PALO ALTO, Calif. — Hewlett-Packard Co. has unveiled financial accounting software products for its HP 3000 business computer systems.

General Accounting/3000 is comprised of three standard applications products: General Ledger/3000, Accounts Payable/3000 and Accounts Receivable/3000. Each is said to function as an accounting subsystem to meet the needs of companies that do not require all three applications, according to the vendor.

A key feature of General Accounting/3000 is said to be its on-line and interactive orientation. Users reportedly can specify system parameters, edits and table entries to control processing and reporting.

Users working at interactive terminals are provided with menu-like screens, the vendor said, and entries that create or change accounting transactions can be entered, retrieved or modified through preformatted screens.

General Accounting/3000 reportedly can be installed on a single-computer system or on multiple-CPU systems at the customer's option, the vendor said.

General Accounting/3000 products are available separately. General Ledger/3000 is priced at $7,000, Accounts Payable/3000 costs $7,000 and Accounts Receivable/3000 is available for $7,000. Source code for each product is available for an additional $3,000.

First deliveries on General Accounting/3000 products are expected in January, the vendor said from 3000 Hanover St., Palo Alto, Calif. 94304.

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# Text Editor For PE Systems Added by Array

WILLOWDALE, Ont. — Array Systems Computing has announced PET, a text editor for Perkin-Elmer 32-bit systems, designed as a replacement for the OS32 editor.

PET can insert an implicit statement after each subroutine statement with one command in Fortran. This contrasts with hundreds of commands needed to achieve the same result with the OS32 editor, an Array Systems spokesman said.

For more sophisticated users, macro editor commands with conditional execution statements are also available as well as a pattern matching facility, buffers and regular expression syntax.

PET sells for $1,400, with discounts for subsequent installations. Array Systems can be reached at P.O. Box 1053, Willowdale, Ont. M2J 1L6, Canada.

# DEC Users Get Teleconferencing

BOULDER, Colo. — Cross Communications Co. has introduced Matrix Transaction Exchange (MTX), a teleconferencing software program. MTX will be available for sale or trial testing through time-sharing services offered by GTE Telenet, Inc. The initial MTX release can be used on Digital Equipment Corp.'s VAX-11/780 and other systems.

MTX enables a computer teleconferencing system to handle messaging, office conferencing, electronic mail, newsletters and other features. It also interfaces with word and data processing systems. With other teleconferencing systems, participants must be at certain locations at the same time even if they are in different time zones. With MTX, participants can interface the computer at any time and do not have to be in one place at a specific time.

The system sells for $35,000 and will be available in mid-March. It can also be purchased on a time-sharing basis. Further information is available from the company at Suite B, 934 Pearl St., Boulder, Colo. 80302.

# *'PDS' Backs Purchasing Staff On IBM CPUs*

INDIANAPOLIS — Anacomp, Inc. has introduced an interactive Purchasing Decision Support (PDS) package for use on IBM and plug-compatible mainframes that is intended to provide purchasing departments with on-line access to comprehensive requirements and vendor information.

With PDS, the purchasing professionals can use a CRT to maintain quotation records, create and track purchase orders, generate follow-up reports and letters and monitor vendor performance, the vendor explained. Additional functions reportedly process receipts and invoices to close the loop on the purchasing cycle.

Complete system support, including planning and consulting, conversion assistance, installation and user training, will be provided by Anacomp. A simulation model of the complete PDS system is available at Anacomp's Cleveland office.

PDS is priced at approximately $300,000, depending on the amount of customization required and the user's configuration, the vendor said from 11550 N. Meridian St., Carmel, Ind. 46032.

# Software Out For Affinity 16

LOS ANGELES — TRW Fujitsu Co. has announced general accounting and word processing software as well as RM/Cobol for the Affinity 16 desktop computer.

The Distribution Accounting System consists of seven interactive modules, ranging from accounts receivable with billing and sales analysis to general ledger. A major advantage of the WP package is said to be a limited-access utility that controls use of the system.

RM/Cobol, now supported by the Affinity 16 in addition to Business Basic and Scientific Basic, is said to be compatible with the Texas Instruments, Inc. TI-990, NCR Corp. and Zilog MCZ Cobol languages.

The Distribution Accounting System software costs $500/module; the WP software costs $1,000.

The firm is located at Suite 620, 9841 Airport Blvd., Los Angeles, Calif. 90045.

# Business Software Offered for HP 1000

TAHOE CITY, Calif. — ABC Computers, Inc. has announced Version 1.0 of its business software for Hewlett-Packard Co. HP 1000 processors.

Features of Accounting By Computer include multicompany, division and profit center accounting with optional consolidated financials available. Modules include accounts receivable, accounts payable and general ledger packages, the vendor said.

The package costs $5,000/module, plus an annual $500 support charge, the firm said from 140 Mackinaw Road, P.O. Box 6899, Tahoe City, Calif. 95730.

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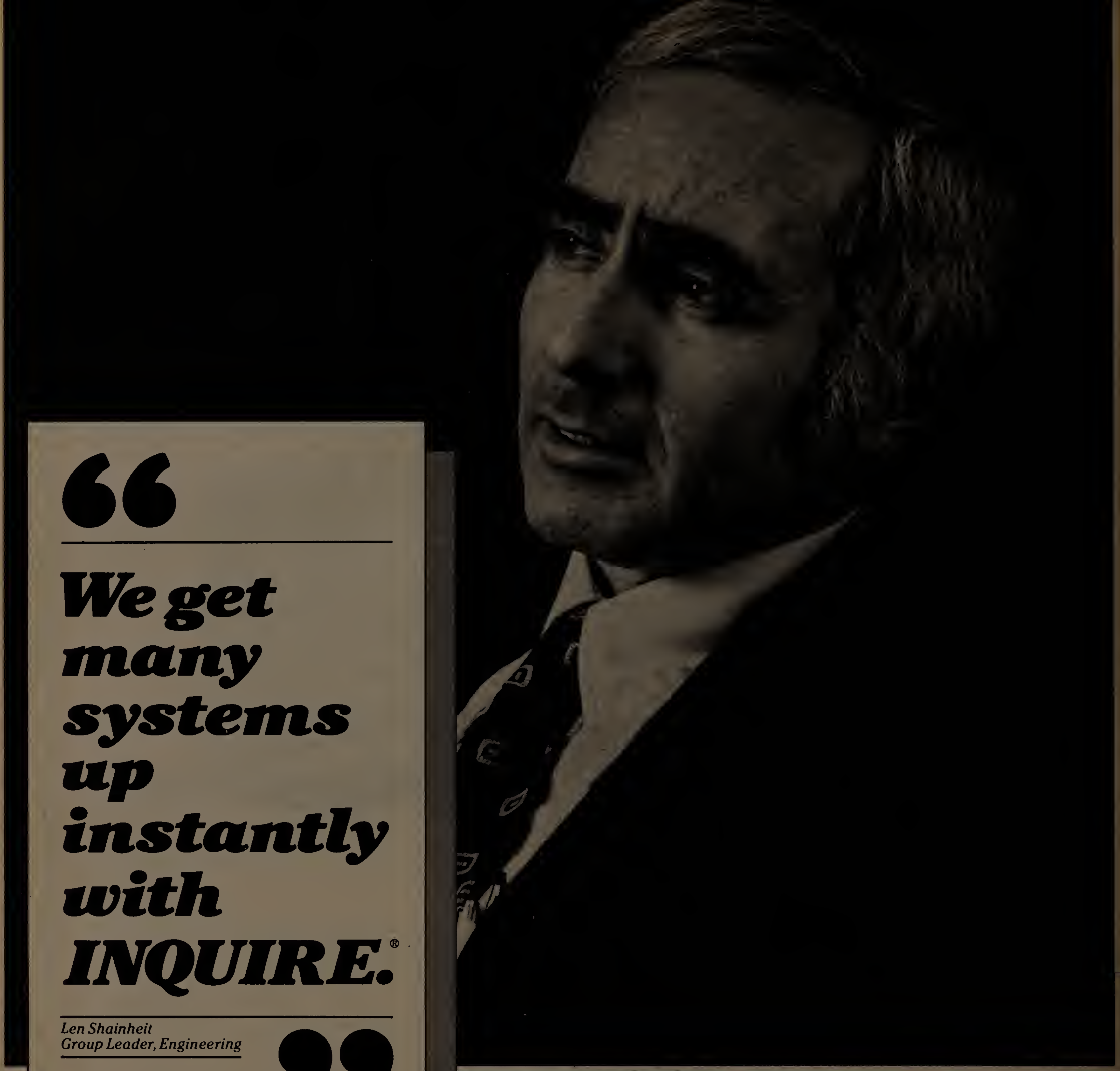

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# File Management Package Fits DG Nova, Micronovas

WESTBORO, Mass. — A File Management Package for its Nova minicomputer as well as its Micronova and MPT/100 micro-based systems has been announced by Data General Corp.

The File Management Package runs under the vendor's real-time, multitasking MP/OS operating system. It consists of Isam and a sort/merge utility.

The Isam is designed to enable users to access information without extensive iterative sorting. It reportedly allows data to be extracted without making multiple passes of a file through a program.

The MP/Isam file structure consists of a data file that contains data records and one or more index files. Each index file is said to contain keys to identify data records and has pointers that indicate the data record in the data file. One type of key is a time stamp whereby incoming data is chronologically noted by the computer.

The sort/merge utility reportedly provides a range of file sorting and merging options. It sorts in ascending or descending order and merges up to 10 sorted files. Either fixed-length or variable-length records can be used, the vendor said.

The File Management Package also is compatible with DG's Advanced Operating System, the vendor noted. The price for the MP/OS File Management Package (Model 3776) is $1,250 for initial license. The AOS/MP/File Management Package (Model 3786) is priced at $950 for initial license. The AOS/VS (16-bit) MP/File Management Package (Model 3686) is available for $950 for initial license.

Delivery is scheduled for 60 days after receipt of order, the vendor said from 4400 Computer Drive, Westboro, Mass. 01580.

# *NAI-Rcode Aids Conversion of CICS From Macro to Command-Level Programs*

DECATUR, Ill. — Nims Associates, Inc. announced the availability of NAI-Rcode, a Cobol programming aid designed for use in coding IBM CICS command-level programs and converting CICS macro-level programs to command level.

NAI-Rcode is a Cobol working storage area description to which executive interface block may be moved for evaluation in structured Cobol logic, using Cobol condition names, the vendor said. The product is designed to provide improved readability, better documentation and more standardized handling of CICS exceptional condition evaluation.

According to Nims Associates, NAI-Rcode may be used during the conversion of CICS programs from macro level to command level.

NAI-Rcode, along with the Cobol source program that generates it, is available for a one-time license fee of $200 from Nims Associates, 363 S. Main St., Decatur, Ill. 62523.

# Version 5.0 Of Blis/Cobol Fits DG Nova

ORLANDO, Fla. — Information Processing, Inc. has announced Version 5.0 of its Blis/Cobol operating system for Data General Corp. Nova and Nova-compatible minicomputers. It reportedly supports up to 2M bytes of main memory and has virtual memory capabilities.

The vendor said that up to 30 users can each run up to 200K-byte Cobol programs without any modification on CPUs using either 16-bit extended memory addressing or up to 2M bytes of mapped memory.

The vendor claimed an increase in throughput (over 40%) with Version 5.0 and additional throughput via overlapped disk I/O transfers.

The single-user price for Blis/Cobol supporting 64K bytes of memory is $830, the vendor said from 1850 Lee Road, Winter Park, Fla. 32789.

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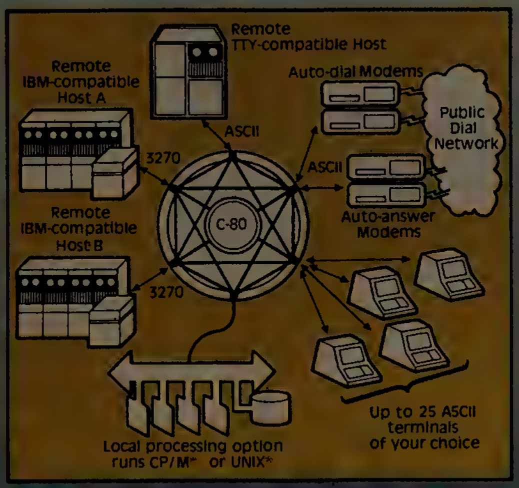
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### Spectrum Introduces Host of Additions

# Development Methodology Enhanced

CULVER CITY, Calif. — Spectrum International, Inc. introduced a project development methodology as well as an on-line project estimator resident on Apple Computer, Inc.'s Apple-II microcomputer, a project software control interface, an IBM IMS version of its basic Spectrum methodology and a Systems Programming Methodology.

Spectrum-2 is an enhanced version of the vendor's Spectrum-1 project development methodology. It includes the identification and encouragement for the necessary training in the structured techniques, on-site assistance to get the initial projects started properly using the structured process and the methodology to control the sequence and format of the deliverables on all projects, the vendor explained. Spectrum-2 ranges in price from $40,000 to $200,000.

Spectrum-3, the interactive on-line project estimator that is resident on the Apple-II microcomputer, reportedly is provided with the Spectrum data base for producing the required systems development and product development deliverables needed on every DP project. It is priced between $12,000 and $18,000.

The PAC-II project control software interface for the Spectrum-1 and Spectrum-2 methodologies is designed to inform those working on project control when and how to exit from the methodology and enter the project control software. PAC-II is priced at $3,000. The IMS version of the Spectrum methodology reportedly incorporates the Spectrum product with specific materials required for the design of IMS and IMS/DC projects. It is priced at $5,000.

The new version of the Systems Programming Methodology is said to employ practical checklists that permit the manager of the systems programming function to prioritize the work of his group and control the backup, security and documentation for changes to the operating software. It is priced at $5,000.

The vendor is located at Suite 150, 6101 W. Centinela Ave., Culver City, Calif. 90230.

# *Streaming Software Transfers Data For PDP-11*

SANTA CLARA, Calif. — "Streaming" software designed for use with Digital Equipment Corp. PDP-11 minicomputers was announced here by Spectra Logic Corp.

Spectra Stream RSX stand-alone streaming software is said to allow the transfer of data from disk to tape continuously.

The product is intended for both "start/stop" and streaming ½-in. formatted tape drives, according to the vendor.

Spectra Stream RSX was designed as a stand-alone program to stream RSX-11M-compatible disks to formatted 100 in./sec streaming tape drives via the vendor's DEC PDP-11/VAX-compatible Spectra 21 emulating, multifunction disk/tape controller.

The product is available on DEC/Ansi compatible or 1600 bit/in. magnetic tape for a one time $500 charge, according to the vendor at 1227 Innsbruck Drive, Sunnyvale, Calif. 94068.

# Graphics Tool Written in Dibol

SPRINGFIELD, Ill. — A financial graphics management software package has been announced by Irwin M. Jarett, C.P.A., Ltd.

Fingraph is said to convert traditional tabular financial statements, schedules and reports to standardized graphics charts. With report generation capability, the system ties directly to current data bases or can be operated as a stand-alone system, the vendor said.

Fingraph is written in Dibol, utilizing the Regis graphics commands for use with Digital Equipment Corp.'s VT125 graphics CRT terminal or DEC's Gigi system. The system runs under DEC's CTS 300 or CTS 500 (RSTS/E) operating systems.

The package costs $9,750 for the first CPU, a spokesman said from Suite G, 960 Clock Tower Drive, Springfield, Ill. 62704.

# Two Utility Tools Run on DEC LSI-11s

SCOTTS VALLEY, Calif. — Larry Weaver Associates has introduced two utility packages for use with Digital Equipment Corp. LSI-11 processors.

One is a telecommunications utility named Power, which permits the RT-11 operating system to act as an intelligent terminal, accessing any host system through the host's normal terminal interface. Power permits source file transfers between the host and the RT-11 file system. It also provides a keyboard macro facility and the capability of logging all input and output during a session.

Archiv is a multivolume file backup utility. Both packages are available by mail on RX01-compatible single-density diskettes. The packages are priced at $200 each or $380 for the two. Documentation costs $15 for each package, the vendor said from 305 Northridge Drive, Scotts Valley, Calif. 95066.

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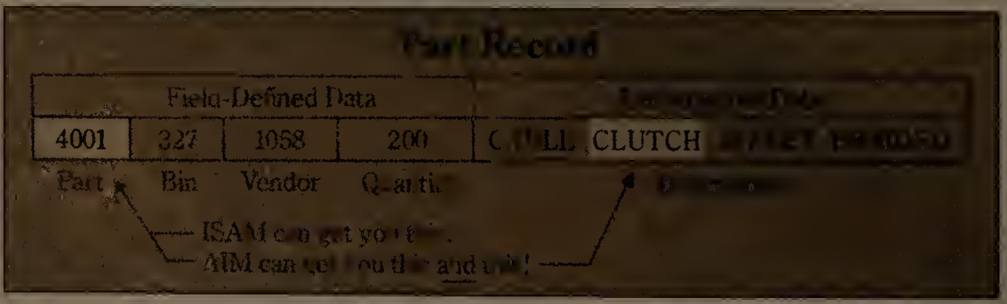

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# Operating System, Cobol For PDP-11 Gets Updates

NASHVILLE, Tenn. — S&H Computer Systems, Inc. released Version 2.1 of TSX-Plus, an operating system for Digital Equipment Corp.'s PDP-11 systems, and Version 2.1 of Cobol-Plus for the PDP-11.

Enhancements to TSX-Plus reportedly include a real-time program support facility that allows multiple real-time programs to be run concurrently with normal time-sharing operations.

Other features included are data and directory caching, shared-file record locking, transparent line printer spooling, detached jobs and virtual lines and a log-on security facility that maintains systems usage information, the vendor said.

Version 2.1 of Cobol-Plus is said to include a shared runtime system under TSX-Plus, which requires 46K bytes of memory regardless of the number of jobs that are running. It reportedly contains most of the Level 2 features of the 1974 Ansi standard and features automatic program segmentation, as well as a 10-key self-reorganizing Isam with a dynamic eight-tree structure.

TSX-Plus is priced at $2,000 for a primary license, and the cost for each additional CPU is $500. A compiler version of Cobol-Plus costs $2,000. A runtime version is priced at $850. TSX-Plus and Cobol-Plus can be purchased together for $3,500, including the Cobol-Plus compiler. Without the compiler, the joint package is priced at $2,550.

S&H Computer Systems, Inc. is located at 1027 17th Ave. S., Nashville, Tenn. 37212.

# *'Comcapp' Out For VAX-11s*

ANN ARBOR, Mich. — Manufacturing Data Systems, Inc. (MDSI) has announced the availability of its Comcapp Process Planning System for the Digital Equipment Corp. VAX-11 series of 32-bit superminicomputers.

Comcapp is a fully interactive system and includes a recommended code group technology capability.

The program costs between $100,000 and $150,000, depending upon the options chosen. It is also available on a time-sharing basis from MDSI, which can be reached at 4251 Plymouth Road, P.O. Box 986, Ann Arbor, Mich. 48106.

# 'Version 3' Runs On VAX Systems

FARMINGTON, Conn. — Computer Covenant Corp. has announced that its Integrated Manufacturing and Financial System Version 3 is available on Digital Equipment Corp.'s VAX-11/750 and 780 systems. The software initially ran on the PDP-11.

Version 3 allows small- to mid-size job shop manufacturers to track the location and progress of jobs, control the cost of production, plan for future capacity and estimate costs and quantities.

The system is priced at about $30,000. It can also be purchased on a module-by-module basis. Computer Covenant is at 790 Farmington Ave., Farmington, Conn. 06032.

# TI Adds Full Mapping To 'MMP'

DALLAS — Texas Instruments, Inc. has enhanced its MMP high-level language to provide full-memory mapping capabilities. The release is called MPP 4.0.

The language includes a tool set oriented toward large programming projects on 16-bit microprocessors. Also known as Advanced Microprocessor Pascal, the language was developed to support the TMS9900/99000 family. Features include power-up configurability, software development tools for multiprocessing configurations and a modular architecture, the vendor said.

The language costs $3,200 on floppy diskette, $3,500 on the firm's DS31 or DS10 hard disks and $3,900 on T25 or T50 hard disks, according to the vendor. TI can be reached through P.O. Box 202129, Dallas, Texas 75220.

# Datamatics Offers Series/1 EDX Utilities

WASHINGTON, D.C. — A package of 16 IBM Series/1 EDX utilities was announced here by Datamatics, Inc.

The Datamatics package reportedly consists of 16 general use utilities that can be installed on any Series/1 running EDX. The utilities include Cheshire labels, file listings, disk searching or selecting, reformatting of disk records, Ascii to Ebcdic and vice versa, remote user log-on routine, fast disk-to-disk copying and screen browsing of disk contents.

The software is priced in packages of three or more utilities, beginning at $190/package, the vendor said from Suite 102, 2120 L St., N.W., Washington, D.C. 20037.

Datamatics also is offering a free 60-day trial that includes a diskette that the prospective purchaser can use to test each utility either on sample data, which is provided, or on his own applications.

Gerald Ford

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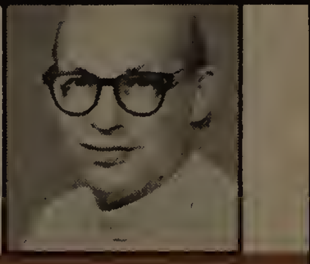
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## *Manufacturing Software Gets Three Additions*

MENDOTA HEIGHTS, Minn. — Comserv Corp. has added a Cost Management System (CMS), a Lot Traceability System (LTS) and a Multi-Plant special feature to its Advanced Manufacturing, Accounting and Production System (Amaps) for use on IBM and plug-compatible mainframes.

The CMS module reportedly integrates cost accounting methods with material requirements planning and features automatic preparation of journal entries, inventory valuation and revaluation and job and project costing information.

The LTS module is designed to help manufacturers that use controlled substances, such as narcotics and fissionable materials, in their products. It contains a usage audit trail from vendor lot number through all intervening manufacturing processes to delivery to the customer, according to the vendor.

Multi-Plant is a version of Amaps adapted to the needs of manufacturing companies composed of multiple facilities, the vendor said.

The Amaps package, including all 11 modules, is priced at approximately $515,000, depending on the customer's configuration. The modules are available separately and are priced between $30,000 and $55,000 each. Comserv is headquartered at 1500 First Bank Place W., Minneapolis, Minn. 55402.

## Management Modules Designed for Wang 2200

SEATTLE — An enhanced version of its Distributor Business Management System and a Restaurant Management Information System for the Wang Laboratories, Inc. 2200 system were announced here by The Office Manager, Inc.

The distributor business management package reportedly will enable distributors and light manufacturers to control inventory, manage credit and receivables, improve warehouse productivity and purchase and manage sales staff.

The restaurant management package, designed specifically for the food service industry, is comprised of modules for payroll, general ledger, accounts payable, inventory control, recipe control, fixed-asset accounting and sales analysis, according to the vendor.

The installed price for both the Distributor Business Management System and the Restaurant Management Information System ranges from $1,700 to $2,200/module, according to the vendor at P.O. Box 66596, 127 S.W. 156th St., Seattle, Wash. 98166.

## Text Editor Fits CPUs, Micros

MENLO PARK, Calif. — Xidak, Inc. has announced a text editor said to be usable across a wide range of computer systems.

Mainedit features multiple windows, allowing the user to see two pieces of a document or two different files at the same time; multiple files, for reportedly easy text movement between files; demonstration macros, allowing nontechnical personnel to customize the editor; and user extensibility, according to an Xidak spokesman.

Mainedit may also be integrated into a larger software system, such as an electronic mail package. Mainedit is based on Xidak's Mainsail, said to be a completely portable high-level programming language usable on any hardware system from micros to mainframes.

The cost of Mainedit varies according to the processor with which it is used, according to the spokesman; for example, it costs $4,000 for the Digital Equipment Corp. VAX-11/780, $5,000 for the Decsystem-2060 and $1,000 for the Motorola 68000-based Apollo Computer, Inc. machine.

Xidak is located at Suite 101, 530 Oak Grove Ave., Menlo Park, Calif. 94025.

## Software Out For AM Jacquard

DALLAS — Application Management Services, Inc. has announced three software products for the AM Jacquard J100 and J500 computer systems. The packages are:

- A Client Information System for records management that allows the user to enter names of clients, customers, members or any list of products and services.

The package costs $1,500/CPU, the vendor said.

- An Executive Financial System, a financial/industrial modeling package that features color graphics, is available for $5,000.

- Type-Rite, an interface for a color CRT that reportedly enhances the usage of an additional CRT while not being used for color graphics output is available for $500.

The package is an option to the Executive Financial System, the vendor said.

The vendor is located at 7616 LBJ Freeway, Dallas, Texas 75251.

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## *Network Processor Based on Level 6*

NEW YORK — Advanced Computer Techniques Corp. (ACT) has unveiled a network processor based on the Honeywell, Inc. Level 6 minicomputer.

The Network Processor can be configured to act as a remote concentrator, cluster controller and message switch, according to the vendor.

In addition, the system may serve as a node of a centralized or distributed network, the vendor added.

Other features include message routing based on logical destination, station address or message header; local disk storage for message transaction queueing; downline loading of intelligent terminals; remote console operation for centralized network administration; and Binary Synchronous Communications 2780/3780 support, the vendor said.

The Network Processor costs approximately $100,000 with software, depending on the required configuration, ACT said from 437 Madison Ave., New York, N.Y. 10022.

## Processor Permits NCR Net Growth

PACHECO, Calif. — A communications processor to permit expansion of NCR Corp. terminal networks is available from Century Analysis, Inc.

The Office Systems Interface (OSI) is said to eliminate the use of line concentrators and multiplexers. It also offers economy by allowing the use of low-cost conversational terminals for data input, a Century Analysis spokesman said.

The device uses a microprocessor and load-leveling and flow-control software to allow full front-end flow control. A single OSI can support up to 20 full-time, multifunction workstations. More stations can be added by interconnecting two or more OSI units.

The OSI costs $10,950 from Century Analysis at 114 Center Ave., Pacheco, Calif. 94553.

## RSTS/E Nets Tied With Other Nets

WILLOWDALE, Ont. — Digital Management Group has unveiled a network communications system for Digital Equipment Corp. RSTS/E users.

DMG/Net is said to interface with the Datapac, Telenet and overseas X.25 packet-switching networks. It provides two-way file transfer and interactive dialogue capabilities between a local RSTS/E host and other RSTS/E systems. Communications with IBM and other non-RSTS/E systems is also possible, but must be initiated by the local RSTS/E host.

Through table-driven software, DMG/Net provides interface and network flexibility. For example, as new microcomputers become available and are interfaced with the RSTS/E host, DMG/Net can handle dialogue requirements between the two central processors.

The price for the communications system starts at $10,000, DMG said from 4800 Yonge St., Willowdale, Ont., Canada M2N 6G5.

# Portable Terminal Helps Keep Homeowners Warm

**By Jim Bartimo**
CW Staff

WEST NEWTON, Mass. — Some Massachusetts homeowners were warmer than others when a near-zero cold spell hit New England last week and they owed it — in part anyway — to a portable terminal.

Massachusetts is one of a handful of states that is fully utilizing funds provided by the National Energy Conservation Act of 1977 to supply its homeowners with home energy audits. Mass-Save, a nonprofit coalition of some 57 utilities in the state and overseen by the state's Executive Office of Energy Resourse, is responsible for conducting the audits.

For a cost of $10 to a homeowner, an energy auditor will visit to conduct a two-hour interview consisting of 150 prepared questions pertaining to the age of the house, the type of heating systems used and other such information. The auditor then keys in the information to one of two Digital Equipment Corp. VAX-11/750 processors via a Texas Instruments, Inc. Model 745 portable terminal.

The TI 745 immediately prints out an energy audit, suggesting ways for the homeowner to insulate the home and cut energy costs. The homeowner also receives an estimate of what the heating bill will be if the improvements are not made.

The audit provided by one VAX-11/750 will suggest a number of ways the homeowner can save on bills — from insulating to installing storm windows. The other VAX-11/750 records the audit and eventually stores it on tape.

The auditor records the printout on a pressure-sensitive data sheet that is given to the client and the regional offices. He also gives the client names of area contractors and banks that have been screened by the organization.

"We did our first audit on Dec. 30, 1980, but in 1981, 60,000 of these audits were completed," said the general manager of Energyworks, Doug MacKenzie, whose West Newton firm was contracted by Mass-Save to conduct the audits. "With five regional offices and 80 to 225 auditors out in the field, the only limit to doing more audits is the number of homeowners who request them."

### Total Investment

The total investment of the homeowner is two to three hours and $10. An average of 2,000 clients per week request an audit. "A homeowner will hear about this service through [a leaflet that comes with] the utility bill, an advertisement or read about it in the paper. The goal of the program is to entice the homeowner into action," MacKenzie said.

Mass-Save's office in Boston has two DEC VT100 CRT terminals to service the toll-free hotline available to the state's homeowners and a DEC LA 120 to compile and print summary reports for the state office, internal management and the Department of Energy. Each regional office is equipped with a DEC LA 120 and a 1,200 bit/sec Racal-Vadic Corp. VA 3455 modem.

At Energyworks, a VT100 is used to service a toll-free hotline for auditors.

"We use the VAX 11/750 because it is fast and allows us to be fully dedicated," MacKenzie says. "We wanted to be interactive. The system has a significant 'Help menu' that we couldn't put on a smart terminal."

Energyworks contracted Strategic Information, Inc. of Burlington, Mass., to provide the computing power of the VAX-11/750s. An equipment rental company, Leasametric, Inc. of Foster City, Calif., provided the LA 120 portable terminals.

## Model 500 Gains Add-On Module

SALT LAKE CITY, Utah — Questronics, Inc. announced a new add-on module for its Model 500 Performance Monitoring System. Designed to support Sperry Univac's Uniscope 100/200 polled-synchronous telecommunications protocol, the Model 580 add-on module has host or remote-site response-time monitoring capability, according to the vendor.

It reportedly can be physically connected locally on the data communications line or remotely at the multiplexer for transaction performance monitoring of a particular station's activity.

Software residing in the module allows front-panel programming for automatic monitoring and print-out of up to three statistical data sets without impacting the user's host software, the vendor said.

The first group of response-time statistics is printed and includes average poll-cycle time, average response time, standard deviation of response time and the current number of transactions. The vendor explained that the second group of statistics includes minimum transaction time, maximum transaction time, total transaction time, the number of transactions over threshold, percent of transactions over threshold and indentifies the threshold switch settings. The third group also includes a histogram of all transactions monitored.

The Model 580 reportedly includes all standard bit/sec rates up to and including 9600 bit/sec, is rack mounted with RS-232C connectors and is priced at $1,000. The vendor is located at 3565 S. W. Temple No. 5, Salt Lake City, Utah 84115.

## *SMM Unveils Control Software*

SACRAMENTO, Calif. — Software Module Marketing, Inc. (SMM) has introduced the Teleprocessing Remote Access Control System (SMM/Tracs), which, it claimed, simplifies the programming needed to transmit batch data between computers and teleprocessing devices.

Via standard teleprocessing connections, SMM/Tracs reportedly supports IBM's DOS to OS systems, as well as equipment from Honeywell, Inc. and Burroughs Corp. and a variety of data entry terminals, point-of-sale cash registers, minicomputers and microcomputers and batch terminals.

Programmers build the data transmission program by defining the configuration needed with keyword parameters, the vendor explained. SMM/Tracs is said to allow data to be read from, or written to, either tape or disk. The vendor said SMM/Tracs also runs concurrently in different partitions, if necessary; runs as a dial-up system that supports auto dial, manual dial and/or auto answer and runs as a leased-line system.

Pricing is $4,950 for the first CPU. Each additional CPU is $2,475, the vendor said from 1007 Seventh St., Sacramento, Calif. 95814.

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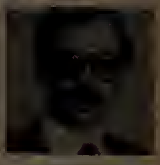
**COMPUTERWEEK**
**Schedule of Events**
**March 2 – 5, 1982**

**Productivity & Information Systems Planning**

"Strategic Management of EDP Resources" *John M. Thompson, Vice President, Index Systems*

"EDP Economics and Software/Organizational Productivity" *Werner Frank, Executive VP, Informatics, Inc.*

"Case History in MIS Productivity Improvement" *Daniel Merrell, Manager, Productivity and Technical Training, Union Carbide Corporation*



"Applying 'Theory Z': A Case History in Implementing Japanese Management Techniques in the U.S. Computer Industry" *John Rehfeld, VP and General Manager, Toshiba America, Inc., Information Processing Systems Division*

"Data Processing Management's Role in Office Automation" *Walter E. Ulrich, President, Walter E. Ulrich Associates*

**Hardware & Capacity Planning**

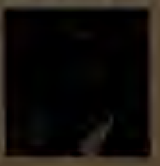
"Performance Modeling" *Barry Stevens, VP, Performance Management Associates*

"Software Engineering in the Productivity Environment" *Ken Kolence, President, Institute for Software Engineering*

"Reducing System Definition-Development Lifecycle Costs" *Gopal K. Kapur, President, Kapur & Associates, Inc.*

**Human Resources**

"The Personnel Crunch in Data Processing" *Harold S. Bott, Partner, Arthur Anderson & Company*



"The Programmer Gravy Train Derails" *Charlene Francl, Consultant, Quality Assurance, Security Pacific National Bank, with Thomas J. Francl, Director, Information Services, The Bekins Co.*

**Telecommunications & Distributed Processing**

"New Application Opportunities in Telecommunications" *Professor Leonard Kleinrock, School of Engineering & Applied Science, University of California at Los Angeles*

"Social and Economic Impact of Telematics" *Dean Gillette, Executive Director, Corporate Studies, Bell Laboratories*

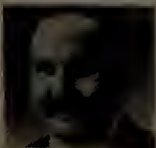
"Using Non-IBM Systems in SNA Environments" *Saroj K. Kar, President, Telcom Computer Technology International*

"Future of the SNA Applications Environment" *John King, President, 3K Group*

**Software Development & User Applications**

"Improving Programming and Programmer Productivity" *Jack E. Ewers, Manager, Systems & Programming, Honeywell, Inc.*

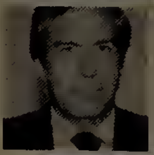
"Engineering Fourth Generation Software Products and User Applications" *Martin Goetz, Senior Vice President, Applied Data Research, Inc., Director, Software Products Division*



"Productivity Leverage Through System Utilities" *Asa Lanum, Vice President/Advanced Development, Pansophic Systems*

"Higher Level Languages: Status, Prospects & Payoffs" *Jim Wilcox, VP, Heneco, Inc.*

**Software Strategy**



"IBM Software Strategy for the 1980's" *Robert Cook, VP, VM Software*

"Large Processor Architecture Trends" *Bryant Jeffries, Strategic, Inc.*

"Guaranteed Systems: Applications Development Through Hardware Concepts" *Dan Nolan, Deputy Director, Business Data Processing, Computer Sciences Corporation, Systems Division.*

"Survivable Systems" *Dr. W.H. Highleyman, President, Sombers Associates, Inc.*

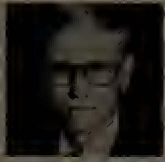
**Database**

"Strategies & Implementation of the Corporate Data Base" *Leo Cohen, President, Performance Development Corporation*

"Data Structured Design for Distributed Data Processing" *Hugh W. Ryan, Arthur Anderson & Company*

"Mainstream Choices In Database" *Charles Bachmann, Vice President, Cullinane Data Base Systems*

**Market Opportunities**



"Future of the PCM Mainframe Vendors" *Duane Kirkpatrick, Partner, Robertson, Coleman, Stephens & Woodman*

"Telecommunications: The Bridge Between Word and Data Processing" *Walt G. Frederickson, Vice President, Technology, Harris Corp.*

"Local Networks: Planning For Maximum Application Potential" *Frank Dzubeck, President, Communications Network Architects, Inc.*

"Have You Missed The Venture Capital Boom?" *Roy Rogers, Partner, Hambrecht & Quist*

"Measuring And Improving Programmer Productivity" *Girish Parikh, President, Shetal Enterprises*

"Why Management Hates DP (And What To Do About It)" *Walter Lankau, Vice President, Management Decision Systems*

"How to Cut Support Costs with Professional Documentation" *Stephanie Rosenbaum, President, Tech-Ed*

"Concepts and Trends in Information and Data Resource Management" *Steven H. Spewak, Vice President, Performance Development Corp.*

## [illegible]

THE OEM BUSINESS FORUM

"The Economic Outlook for the OEM...Boom or Gloom" *Chairperson: Adolf "Sonny" Monosson, Chairman, American Computer Group, Inc.*

"Japanese Vendors Meet the Press" *Chairperson: Peter Bochner, Los Angeles Bureau Chief, Computer Business News*

"The Vertical Marketing Survival Guide" *Chairperson: Lawrence D. Dietz, MBA, JD, President, The Alec Group*

"Complex Legal Issues Affecting The OEM" *Chairperson: Richard Raysman, Attorney, Brown & Raysman, and Contributing Columnist, Computer Business News and Peter Vogel, Attorney, Peter S. Vogel, P.C.*

"The OEM Market Analyst ... A Look to the Future" *Chairperson: Tom Casalegno, Vice President, Publisher, Computer Business News*

" 'Retail' Takes on a New Meaning for the OEM" *Chairperson: Deborah de Peyster, East Coast Bureau Chief, Computer Business News*

"The European Market ... How to Break in Successfully" *Christopher G. Codrington, Managing Director, Interco Business Consultants Ltd.*

"OEM Technology...An Intense Overview" *Chairperson: Vic Farmer, Editor, Computer Business News*

"Survival Tools in the 80's" *Chairperson: Richard C. Cole, President, Computer Results, Inc. and Michael R. Wood, Partner, Andreoli, Johanson & Wood*

"Marketing Strategy: Tools To Ensure Continued High Profit" *Jack M. Keen, Director, Management Products, INPUT*

"The Independent Software Business Vendor" *Chairperson: Rory O'Connor, Senior Editor, Software, Computer Business News*

"Taxes ... The Software State Tax Issues" *Rory O'Connor, Senior Editor, Software, Computer Business News*

"Fortune 500 Manufacturers...As OEM Opportunities" *Neil Kleinman, International Data Corp.*

**Other Topics of Interest**

"Software...The State of the Art" • "Software for the Vertical Marketplace" • "The Local Network Avalanche" • "Financial, Banks and Insurance Companies...As OEM Opportunities" • "The Process Control Industry...As An OEM Opportunity"

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"Market for Personal Computers"

"After 'Visicalc,' What?" *Daniel S. Bricklin, Chairman of the Board, Software Arts*

"The Personal Computer: Tomorrow's Business Tool, Today!" *H.E. James Finke, President, Commodore International Ltd.*

"Can Personal Computers Break Users' Application Logjam?" *Kenneth A. Parker, President, Executec Corp.*

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# NCR 2950s Get Two Models

DAYTON, Ohio — NCR Corp. has introduced two models into its 2950 family of programmable CRT terminals featuring flexible-disk mass storage devices and memory extension up to 256K bytes.

The 2950 models' communications features include IBM 3270 Binary Synchronous Communications, IBM 3275 emulation to an NCR Comten communications processor or IBM host and NCR/International Standards Organization asynchronous protocol.

An integrated digital cassette drive incorporates all the functional capabilities of a freestanding drive into terminal cabinetry. The drive is convenient for operator access, but does not interface with the operation of a slip printer module.

The 2950 models start at $4,550, NCR said from Dayton, Ohio 45479.

# Hand-Held Unit Runs 30 Hours

SANTA MONICA, Calif. — A hand-held CRT terminal featuring a 1,600-char. memory, 40-char. five by seven matrix display and full cursor-controlled editing facilities is available from G.R. Electronics, Ltd.

The device also features 11 bit/sec rates selectable up to 2,400 bit/sec for continuous transmission or 9,600 bit/sec for bursts. The unit is self-contained and powered by rechargeable nickel cadmium batteries that give up to 30 hours of continuous operation. Data may be maintained in memory for several months.

The unit sends and receives the complete 128-char. Ascii set, all of which may be displayed.

The hand-held CRT terminal costs $995 from the vendor at 1640 Fifth St., Santa Monica, Calif. 90401.

# 'Telecost' Tool, Price Cuts Bow

ANN ARBOR, Mich. — The DMW Group, Inc. has announced a new version of its Telecost software and reduced prices for its Response 1, Response 2, Network Design and Management System (NDMS) and Advanced Network Design and Management System (ANDMS).

Telecost processes call telephone traffic data in conjunction with information concerning the user's organizational environment to provide management information for monitoring, controlling and allocating telephone usage costs.

The first-year lease price is $20,000; the second and subsequent year's charge is $4,000.

The price reductions for first-year leases are: Response 1 — $5,000 to $1,000; Response 2 — $5,000 to $1,000; Response 1 and 2 — $8,000 to $1,500; NDMS — $20,000 to $5,000; and ANDMS — $40,000 to $12,500.

The second and subsequent year's lease is 20% of the first-year amount, the vendor said. DMW is headquartered at 2395 Huron Pkwy., Ann Arbor, Mich. 48104.

# *Software Ties TI Machines To IBM CPUs*

GAITHERSBURG, Md. — American Computer and Electronics Corp. is offering software that provides intersystem communications between Texas Instruments, Inc. and IBM computers using Binary Synchronous Communications protocol with multileaving.

Hasp 990 emulates an IBM 360/20 workstation and runs on TI 990 Models 4 through 30 under the DX10 operating system. Through any terminal connected to the local TI computer, users can "log on" to an IBM system.

Menu selections include submittal of jobs for transfer to and execution within the IBM host and entry of interactive remote job entry commands.

A single CPU license for a Hasp 990 costs $8,000 from American Computer at Two Professional Drive, Gaithersburg, Md. 20879.

# Texplot-10 Has Graphics Output

BURLINGTON, Mass. — Texprint, Inc. is offering a terminal that provides dot graphics printing output on Texas Instruments, Inc. Silent 700 CRT terminals directly from Tektronix, Inc. Plot-10 formatted data.

The Texplot-10 upgraded terminal provides dual-mode 80/136 col text printing, Tektronix Plot-10-compatible graphics and full compatibility with the graphics protocol standards of Digital Equipment Corp., the vendor said.

The variety of operating modes allows the printing of intermixed graphics/text data for charts, maps, diagrams and formatted reports from Ansi code sequences, Plot-10 commands or Ascii data.

Texplot-10 may be installed in any TI 743, 745, 763 or 765 terminal with a small screwdriver and costs $995, Texprint said from 8 Blanchard Road, Burlington, Mass. 01803.

# Graphics Board Fits Decwriter

SANTA CLARA, Calif. — Selanar Corp. has introduced its SG120R raster graphics board, which provides graphics capability to Digital Equipment Corp.'s Decwriter III LA120 terminal.

The board features a maximum input data rate of 9,600 bit/sec and an average print rate of 752 graphics col/sec, with speed enhancement features allowing the printing head to skip over blank areas, according to the vendor.

The resolution of the SG120R board is 10 dot/in. horizontally by 72 dot/in. vertically. The maximum number of horizontal dot columns is 1,452, and there is no maximum to the number of vertical rows that can be printed.

The board is priced at $600, Selanar said from 437-A Aldo Ave., Santa Clara, Calif. 95050.

# Devices Give 3270s Access to Public Nets

ATLANTA — The Memotec Division of Systcoms, Inc. is offering devices that give IBM 3270 terminal and plug-compatible display system users access to packet-switched public data networks.

The Mpac 4000 data communications processor, using Mpac 3270 software, allows IBM 3270 display systems to access the packet networks without modifying existing hardware or host computer software, the vendor said.

The software supports Binary Synchronous Communications III protocol operation mode in either point-to-point or multipoint configuration using Ebcdic or Ascii codes and can communicate with IBM 3271, 3275 and 3276 control units.

Prices for the package start at $4,000, Systcoms said from 4470 Chamblee-Dunwoody Road, Atlanta, Ga. 30338.

# *IDS Expands Offerings*

LINCOLN, R.I. — International Data Sciences, Inc. (IDS) has announced a limited-distance modem, a portable data communications test set and a multiple modem-line backup switch.

The Model 6210 Limited Distance Modem was designed for asynchronous operation over Telco or private two- or four-wire nonloaded twisted-pair conductors at up to 9,600 bit/sec. Usable in both point-to-point and multidrop configurations, the Model 6210 costs $330.

The Hawk 4010 Datatrap communications test set was designed to monitor and interactively communicate with data appearing at the EIA RS-232 interface.

The microprocessor-based 4010 operates with synchronous data rates up to 19,200 bit/sec in half- and full-duplex modes. Asynchronous operation ranges from 50- to 19,200 bit/sec.

The Model 4010 costs $5,775. The Model 8504-12 multiple modem-line backup switch is said to switch 12 analog four-wire channels.

The Model 8504-12 costs $1,735 from the firm at 7 Wellington Road, Lincoln, R.I. 02865.

# Modem Uses Induction

STARKVILLE, Miss. — An originate/answer modem using an inductive coupling technique for receiving is available from MFJ Enterprises, Inc.

The MFJ-1230 is said to provide reliable data transfer by eliminating errors caused by room noise, vibration and other acoustic coupling problems. It is Bell 103-compatible and operates at speeds from 0 to 300 bit/sec. It also features full-duplex operation and is crystal controlled for high stability.

I/O ports for a cassette tape recorder let users save transmitted data and load it back to their computers or retransmit it later.

The modem costs $129.95 from MFJ at 921 Louisville Road, Starkville, Miss. 39759.

# Feature Out For DCA Net

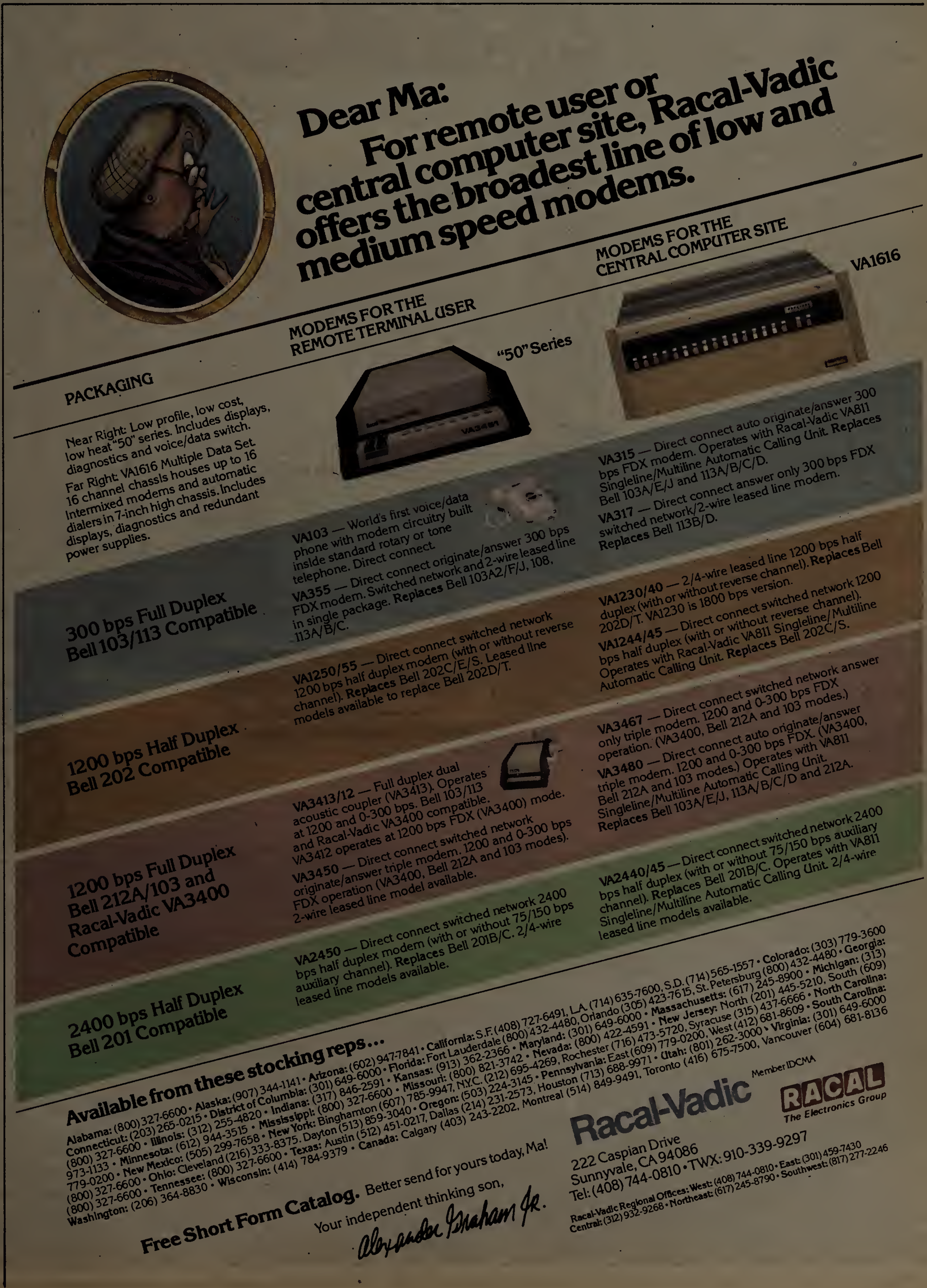
NORCROSS, Ga. — Digital Communications Associates, Inc. (DCA) has unveiled an autobaud propagate feature for its System 355 Master Network Processor.

Autobaud propagate allows all terminal users to access any host computer in the network at the original transmission rate of the terminal without delay, the vendor said.

In some cases, a host computer may not have enough ports to serve many users' terminals running at different transmission rates at the same time, DCA said.

When this occurs, the host computer is usually configured to assign a certain number of ports for each transmission rate. With the autobaud feature, that problem is eliminated, according to the vendor.

The basic unit price for the feature is $10,995, DCA said from 303 Research Drive, Norcross, Ga. 30092.



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**VA315** — Direct connect auto originate/answer 300 bps FDX modem. Operates with Racal-Vadic VA811 Singleline/Multiline Automatic Calling Unit. **Replaces** Bell 103A/E/J and 113A/B/C/D.
**VA317** — Direct connect answer only 300 bps FDX switched network/2-wire leased line modem. **Replaces** Bell 113B/D.

1200 bps Half Duplex Bell 202 Compatible

**VA1250/55** — Direct connect switched network 1200 bps half duplex modem (with or without reverse channel). **Replaces** Bell 202C/E/S. Leased line models available to replace Bell 202D/T.

**VA1230/40** — 2/4-wire leased line 1200 bps half duplex (with or without reverse channel). **Replaces** Bell 202D/T. VA1230 is 1800 bps version.
**VA1244/45** — Direct connect switched network 1200 bps half duplex (with or without reverse channel). Operates with Racal-Vadic VA811 Singleline/Multiline Automatic Calling Unit. **Replaces** Bell 202C/S.

1200 bps Full Duplex Bell 212A/103 and Racal-Vadic VA3400 Compatible

**VA3413/12** — Full duplex dual acoustic coupler (VA3413). Operates at 1200 and 0-300 bps. Bell 103/113 and Racal-Vadic VA3400 compatible. VA3412 operates at 1200 bps FDX (VA3400) mode.
**VA3450** — Direct connect switched network originate/answer triple modem. 1200 and 0-300 bps FDX operation (VA3400, Bell 212A and 103 modes). 2-wire leased line model available.

**VA3467** — Direct connect switched network answer only triple modem. 1200 and 0-300 bps FDX operation. (VA3400, Bell 212A and 103 modes.)
**VA3480** — Direct connect auto originate/answer triple modem. 1200 and 0-300 bps FDX. (VA3400, Bell 212A and 103 modes.) Operates with VA811 Singleline/Multiline Automatic Calling Unit. **Replaces** Bell 103A/E/J, 113A/B/C/D and 212A.

2400 bps Half Duplex Bell 201 Compatible

**VA2450** — Direct connect switched network 2400 bps half duplex modem (with or without 75/150 bps auxiliary channel). **Replaces** Bell 201B/C. 2/4-wire leased line models available.

**VA2440/45** — Direct connect switched network 2400 bps half duplex (with or without 75/150 bps auxiliary channel). **Replaces** Bell 201B/C. Operates with VA811 Singleline/Multiline Automatic Calling Unit. 2/4-wire leased line models available.

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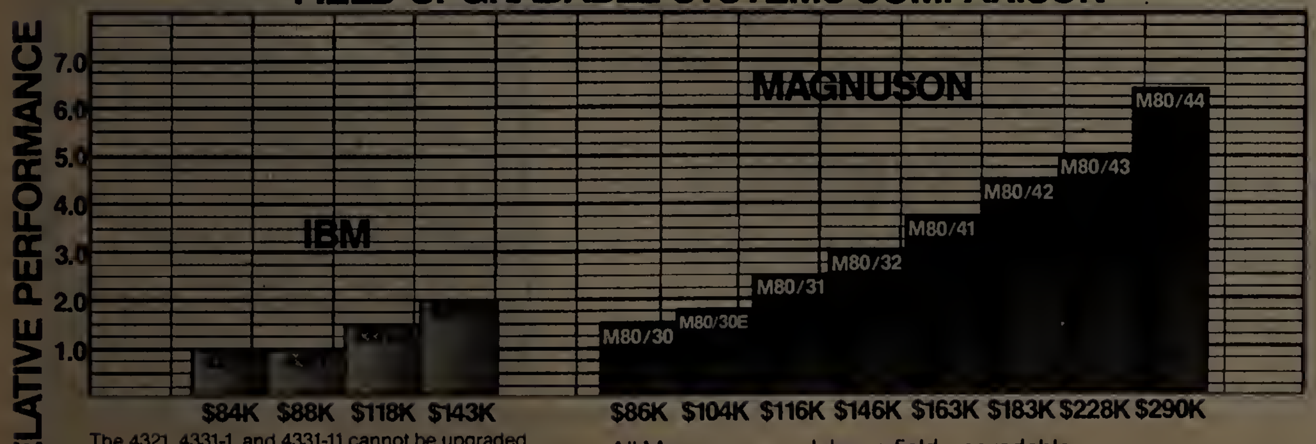

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## *We Need To Communicate*

A Special Report on data communications terminals is coming up, and *Computerworld* wants your help.

We are looking for user, vendor and editorial commentary on the way terminals are making computers more responsive to users' needs.

Possible topics? We're open to your suggestions.

Feb. 10 is the deadline for manuscripts. Submissions in the form of four to seven typed, double-spaced pages should be sent to Bruce Hoard, *Computerworld* Editorial Department, P.O. Box 880, Framingham, Mass. 01701.

## Firm Unveils Statistical Mux

CHAMPAIGN, Ill. — Compre Comm, Inc. has unveiled a statistical multiplexer that provides full remote echoplex, error correction, switch-selectable terminal speed and switch-selectable flow control.

The Economux can concentrate up to four asynchronous terminals on one telephone line (either synchronous or asynchronous up to 9,600 bit/sec) in either a long-haul or short-haul application. All four terminals must run at the same speed.

The switch-selectable flow control allows for either X-on/X-off or clear-to-send method.

Economux costs $975 from Compre Comm, P.O. Box 3570, 3200 N. Farber Drive, Champaign, Ill. 61820.

## *Color Terminal Sits on Desktop*

ATLANTA — Colorgraphic Communications Corp. has unveiled a desktop color terminal that features 180-degree rotation and a tilting arc of 30 degrees.

The MVI-100 has six monochrome emulators that allow use of most applications software previously written for displaying data on standard Ascii terminals. Color highlighting is available through the MVI-100 Color Enhancement Emulation.

The terminal is RS-232C-compatible. Asynchronous protocols are used for communications between it and the host or modem.

It costs $2,750 from Colorgraphic at Suite 105, 2379 John Glenn Drive, Atlanta, Ga. 30341.

## Adds Offers CRT Terminal

NEW YORK — Applied Digital Data Systems, Inc. (Adds) is offering a CRT terminal with a calculated mean time between failure of 23,000 hours.

The Viewpoint/3A Plus offers user-friendly features including a movable typewriter-like keyboard with uppercase/lowercase, AUX on/off and separate numeric key pad cluster. The 12-in. CRT screen displays the standard 1,920 char. in 24 lines, but in a smaller space-saving cabinet.

Characters can be displayed against either a light or dark background..

The CRT terminal costs $650 from Adds at 9 E. 40th St., New York, N.Y. 10016.

## Portable Printer, Terminal Out

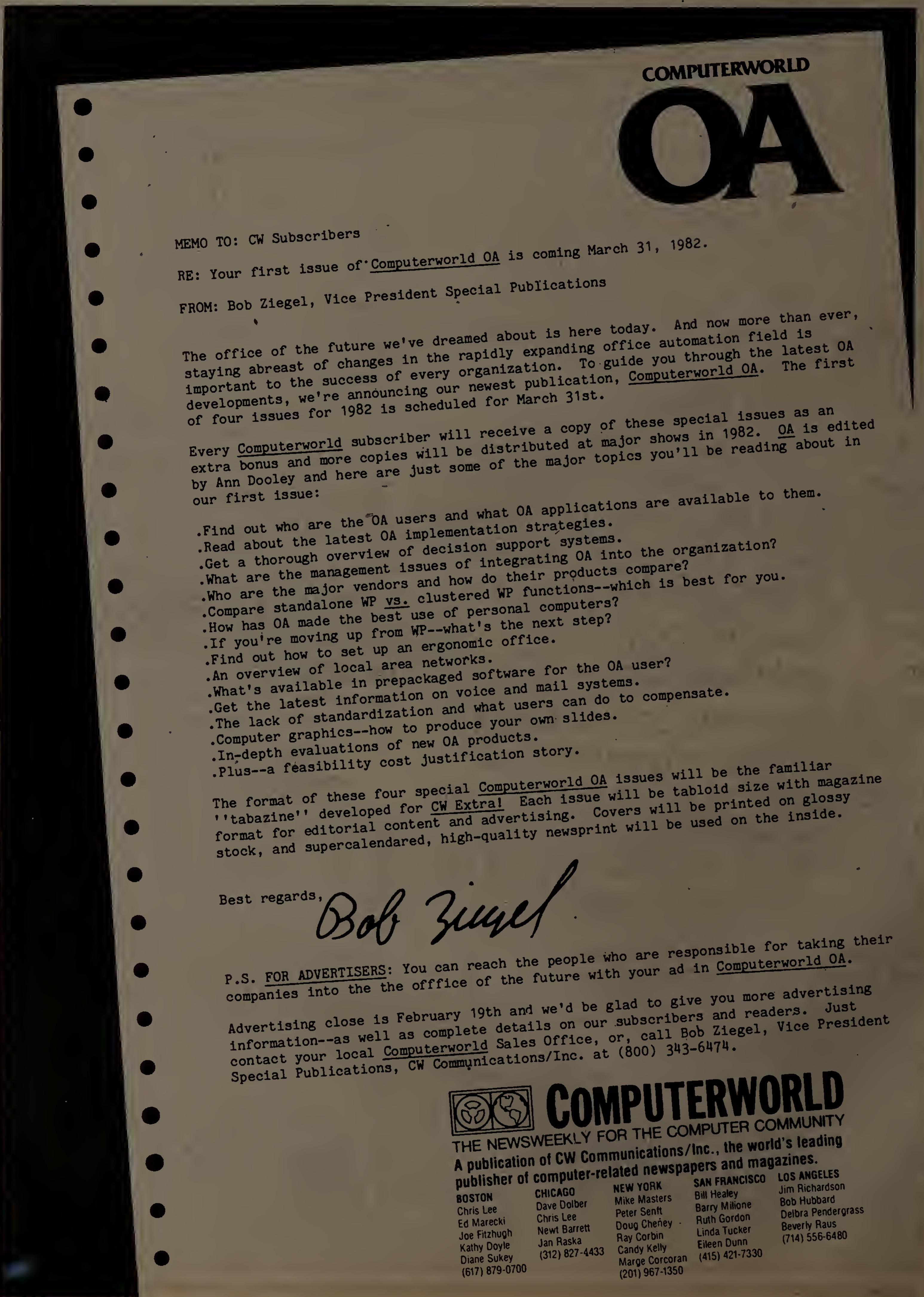
PARAMUS,. N.J. — Computer Transceiver Systems, Inc. has announced a 120 char./sec portable terminal/printer and a portable impact printer.

The Execuport 4120 is a multimicroprocessor-based, 1,200 bit/sec terminal with 120 char./sec thermal printing. It reportedly produces high-resolution characters at 5-, 10- and 17 char./in. and up to 233 char./line.

The Model 4120 user can choose direct connect and/or acoustic modems and can have up to 56K bytes of usable random-access memory.

The Execuport 400 is a 12-lb portable impact printer in three models: 420 Receive Only, 430 Keyboard Send-Receive (KSR) and 440 KSR with built-in 300 bit/sec modem.

The Model 4120 costs $3,295 with lease pricing and quantity discounts available. The Execuport models are priced from $795 to $1,195 from the firm at P.O. Box 15, E. 66 Midland Ave., Paramus, N.J. 07652.



COMPUTERWORLD OA

MEMO TO: CW Subscribers

RE: Your first issue of Computerworld OA is coming March 31, 1982.

FROM: Bob Ziegel, Vice President Special Publications

The office of the future we've dreamed about is here today. And now more than ever, staying abreast of changes in the rapidly expanding office automation field is important to the success of every organization. To guide you through the latest OA developments, we're announcing our newest publication, Computerworld OA. The first of four issues for 1982 is scheduled for March 31st.

Every Computerworld subscriber will receive a copy of these special issues as an extra bonus and more copies will be distributed at major shows in 1982. OA is edited by Ann Dooley and here are just some of the major topics you'll be reading about in our first issue:

.Find out who are the OA users and what OA applications are available to them.
.Read about the latest OA implementation strategies.
.Get a thorough overview of decision support systems.
.What are the management issues of integrating OA into the organization?
.Who are the major vendors and how do their products compare?
.Compare standalone WP vs. clustered WP functions--which is best for you.
.How has OA made the best use of personal computers?
.If you're moving up from WP--what's the next step?
.Find out how to set up an ergonomic office.
.An overview of local area networks.
.What's available in prepackaged software for the OA user?
.Get the latest information on voice and mail systems.
.The lack of standardization and what users can do to compensate.
.Computer graphics--how to produce your own slides.
.In-depth evaluations of new OA products.
.Plus--a feasibility cost justification story.

The format of these four special Computerworld OA issues will be the familiar ''tabazine'' developed for CW Extra! Each issue will be tabloid size with magazine format for editorial content and advertising. Covers will be printed on glossy stock, and supercalendared, high-quality newsprint will be used on the inside.

Best regards,
Bob Ziegel

P.S. FOR ADVERTISERS: You can reach the people who are responsible for taking their companies into the the offfice of the future with your ad in Computerworld OA.

Advertising close is February 19th and we'd be glad to give you more advertising information--as well as complete details on our subscribers and readers. Just contact your local Computerworld Sales Office, or, call Bob Ziegel, Vice President Special Publications, CW Communications/Inc. at (800) 343-6474.

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By Barry W. Boehm

# *Keeping a Lid on* SOFTWARE COSTS

*A look at the problem of software cost estimation and how the Constructive Cost Model (Cocomo) can be used to improve software productivity by 100% in three to four years, and by 400% in six to eight years.*

SOFTWARE PRODUCTIVITY HAS become a critical problem, primarily because the demand for new software is increasing faster than our ability to supply it using the traditional approach. The increased demand for software stems largely from pressures throughout the economy to improve commercial, industrial and service productivity via automation.

For example, Figure 1 (on In Depth/2) shows the growth in software demand across four generations of the U.S. manned spaceflight program. In terms of the number of object instructions generated, demand grew from about one million instructions to support Project Mercury to 40 million instructions to support Space Shuttle operations.[1]

The reasons for this increased demand are basically the same ones encountered by other sectors of the economy as they attempt to increase productivity through automation. The major component of growth in the Space Shuttle software has been in the checkout and launch support area, in which the National Aeronautics and Space Administration (Nasa) automated many functions in order to avoid the requirement for 20,000 people to support each launch, as in previous manned spaceflight operations. The result has been a significant reduction in required launch support personnel, but a significant increase in the required amount of software.

The annual growth rate in demand for new software over the 16 to 20 years of the manned spaceflight program is thus about 20% to 26%. This figure is probably considerably higher than the overall growth rate in software demand, although the 24% annual growth in the total number of computers reported in M. Phister Jr.'s *Data Processing Technology and Economics* would suggest a proportionally high annual growth rate in the demand for new software.[2]

At any rate, the current excess in demand over supply of software personnel would indicate that the growth in our ability to supply new software is not keeping up with the demand. The current annual growth rate in software personnel is generally estimated at about 3% to 4%,[3] although Phister's estimates indicate a growth rate of more like 13% to 14%.

The annual growth rate in software productivity in terms of new object instructions per man-month averaged about 8% to 9% during the 1960s,[4] due largely to the transition from assembly-language to higher-order language software development. However, the prediction that this growth rate would continue through 1985[4] has not been borne out: Later estimates have ranged from 3% to between 5% and 6%.[3]

### Software Cost Estimation

A strong capability to estimate software costs provides two primary keys for improving software productivity. One is a more sound baseline for management planning and control of software projects.

The other, which is discussed in detail in this article, is that many of the software cost-driver attributes are project "controllables"; figuratively, control knobs that can be set to positions that improve software productivity. Clearly, some cost-driver attributes, such as the type of software being developed, are uncontrollable, but most of the cost drivers are at least partly controllable in ways that increase software productivity.

The Constructive Cost Model (Cocomo) summarized below provides a framework for identifying these controllable factors and for assessing their impact on software productivity.[5]

## *Constructive Cost Model*

Cocomo is a new model for software cost estimation based on a carefully screened sample of 63 projects representing business, industry, government and commercial software-house organizations. It estimates the cost of a proposed software product in the following way:

1. A nominal development effort is estimated as a function of the product's size in thousands of delivered source instructions (KDSI).
2. A set of effort multipliers are determined from the product's ratings on a set of 15 cost-driver attributes.
3. The estimated development effort is obtained by multiplying the nominal effort estimate by all of the product's effort multipliers.
4. Additional factors can be used to determine dollar costs, computer

---

*Adapted from the book* Software Engineering Economics *by Barry W. Boehm. © 1981 by Prentice-Hall, Inc. Published by Prentice-Hall, Inc., Englewood Cliffs, N.J. 07632. Telephone order no.: (800) 526-0485.*

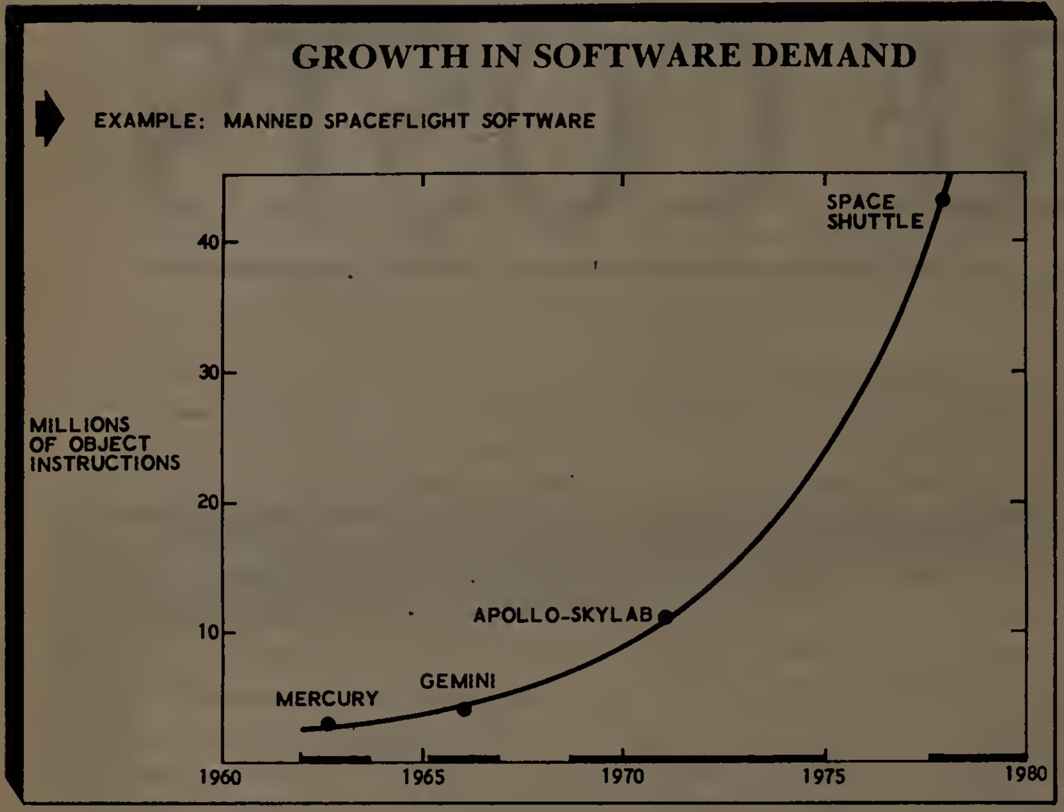

Figure 1

costs, annual maintenance costs and other cost elements from the development effort estimate.

### Nominal Effort Estimation

The Cocomo nominal effort estimator for the most common form of in-house, familiar software development takes the form:

$$MM = 3.2\,(KDSI)^{1.05}$$

where MM is the nominal number of man-months required to go from a reasonably complete software requirements specification to a software acceptance test. Other formulas with higher exponents cover other more tightly constrained forms of software such as for embedded aerospace systems.

### Effort Multipliers

Each of the cost-driver attributes in Cocomo has a rating scale and a set of effort multipliers that indicate by how much the nominal effort estimate must be multiplied to account for the project's having to work at its rating level for the attribute.

For example, Figure 2 shows the rating scale for the "Use of Software Tools" attribute. A project with a "very low" tools rating will require 1.24 times the nominal project effort to complete; a project with a "very high" rating will require only 0.83 times the nominal project effort to complete.

These cost-driver attribute ratings and effort multipliers explain a great deal of the variation in productivity encountered in software projects. Figure 3 shows the degree of agreement between the Cocomo estimates and the actual man-months on the 63-project sample.

### Productivity Ranges

A useful indicator of the relative productivity leverage of a software cost driver is its productivity range: the ratio of the highest to lowest effort multipliers for that cost driver in the Cocomo model. For example, the productivity range for the tools factor is 1.24/0.83 = 1.49.

Figure 4 shows the relative productivity ranges for each of the cost drivers in the Cocomo model. These productivity ranges provide us a means of identifying the high-payoff areas to emphasize in a software productivity improvement activity. For example, we can see that the level of personnel/team capability far outweighs any of the other factors influencing software productivity, while language experience provides only a small amount of productivity leverage.

### *Software Cost Avoidance*

Although Cocomo indicates that people's capabilities are a large cost driver, the biggest cost driver of all is the number of instructions we develop. Thus, one of the primary controllable factors we have for improving software productivity is the number of instructions we choose not to develop, either by deferring the development on marginally useful features or by using already available software via such options as:

- Commercial software packages.
- Adaptation of existing in-house software.
- Program generators (program libraries, software piece-parts, application generators, very high-level languages, automatic programming).

### Software Packages

Software packages are commercially offered products that typically provide solutions to a particular range of software development or applications problems. As they have been developed for commercial sale in a competitive market and used by a wide variety of customers, their vendors generally have invested a fair amount of effort into making them reliable and easy to use.

Software packages have been developed for a wide variety of uses, including the following major usage categories:

- Management information systems (MIS) applications (payroll, general ledger, personnel).
- Industrial support systems (inventory control, process control, production control, order processing).
- Office automation (word processing, correspondence control, electronic mail).
- Utilities (sorting, reporting generation, file processing).
- Software tools.

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- Basic Monitor
- Batch Debug Aids

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**NOMINAL (STRONG MINI/BASIC MAXI)**
- Real-Time/Timeshare OS
- Data Base Management System
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- Interactive Debug Aids
- Simple Programming Support Library
- Interactive Source Editor

**HIGH (STRONG MAXI/STONEMAN MAPSE)**
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- Simple Program Design Language
- Performance Measurement/Analysis
- Programming Support Library — Configuration Management Aids
- Set/Use Analyzer
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Figure 2

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- Range of capabilities
- Technology leverage and risk
- Reliability
- User engineering
- Documentation
- Training
- User group

**DIFFICULTIES**
- Application incompatibilities
- Procurement delays
- In-house expertise not developed
- Problems with in-house improvements
- Lack of controllability

Table 1. Software Packages: Pros and Cons

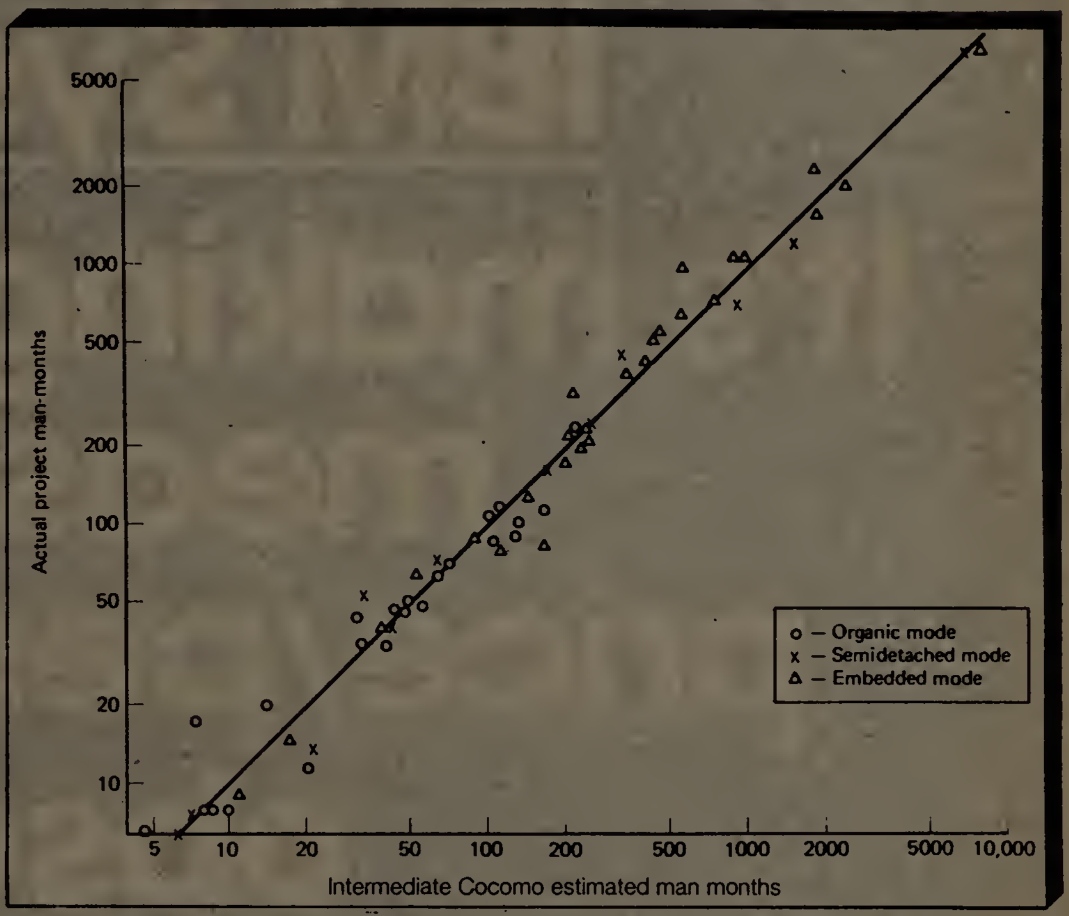

Figure 3. Intermediate Cocomo Estimates Vs. Project Actuals

The software tools available as software packages cover practically all the tools described in Figure 2, ranging from basic programming aids (assemblers, compilers, debuggers) through integrated "programmers' workbench" support environments to advanced requirements language processors and special-purpose support systems for data base management, data communications processing and display processing.

Some of the major advantages and difficulties in using commercial software packages that should be considered in performing a cost/benefit analysis for a software package are summarized in Table 1. Some of the items in the table are discussed in more detail below.

### Advantages of Packages

- *Cost savings.* A commercial software package is developed once, and the development cost is amortized over a large number of users, rather than being totally absorbed by the developer/user organization. For example, a typical large commercial data base management system will cost about $100,000 to purchase and more than $1 million to develop. Informatics, Inc.'s 400-KDSI Mark IV software package has cost about $10 million to date, but its current base price for the top-of-the-line system is $42,000.[6]

One good way of assessing the relative costs of developing a software product, in comparison with acquiring an already-developed software package, is to use a software cost estimation model such as Cocomo. In general, a vendor will be willing to provide approximate sizing information on the components of its software package. We can use this information to develop sizing estimates for the corresponding components we wish in our software application, supply the associated cost-driver attribute ratings for each component and derive a Cocomo software development cost estimate to compare with the cost of the vendor's package.

- *Earlier payback.* A software package is available for service as soon as it is acquired. It thus has a considerable head start in providing benefits to the user organization, compared with the in-house software development option, which does not provide any usage benefits to the organization during the time required to develop the product.
- *Manpower savings.* Another advantage of the commercial software package is that it requires no in-house manpower to develop. Thus, in the sample above, an average of four to five people are made available for 11 months to perform other software functions needed by the organization. This advantage is particularly important to the increasing number of software organizations that find that sheer availability of software personnel is their limiting factor in achieving organizational information processing objectives.
- *Range of capabilities.* A commercial software package, particularly a mature one that has been used by many organizations, will often have additional unanticipated capabilities other organizations have found useful as their operational needs have evolved. An organization that acquires the software package may not be able to use all of these capabilities at first, but they provide an experience-based set of growth options once the basic system has been integrated into the organization's operations.

### Difficulties With Packages

- *Applications incompatibilities.* In many cases, a commercial software package will have a number of built-in assumptions about the users (their education level, motivation level, computer science expertise and so on), about the organization's operational philosophy (centralized vs. decentralized, authoritarian vs. permissive, profit vs. service-oriented) or about the user's organizational structure (project-oriented, skill-centered, matrixed).

Modifying a software package to change or eliminate these assumptions is generally a much bigger job than just putting in a few front-end or back-end fixes. Several examples have involved unsuccessful attempts to use a project management infor-

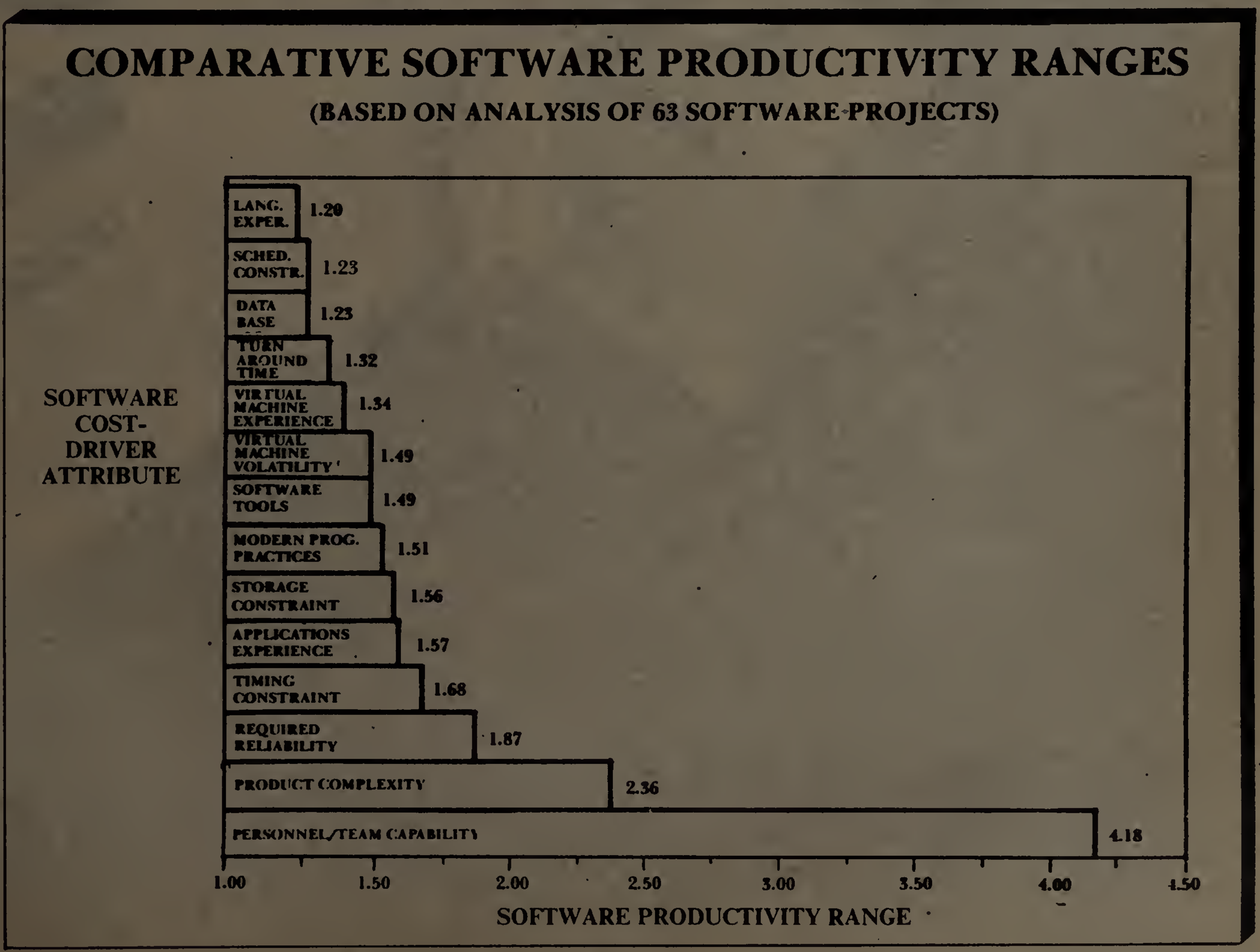

Figure 4

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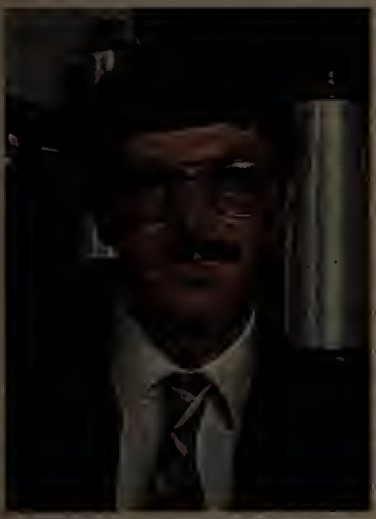

**"We converted from a System/34 to the System/38 and the time saving with System/38 is fantastic. I rewrote a program in a day that previously would have taken two weeks. We completely converted our order entry system programs in four days. We can debug in one-tenth the time. System/38 is a terrific management tool."**

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Clark-Schwebel Fiber Glass Corporation
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Colgate University
Hamilton, New York

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mation system package developed for one type of organizational structure in a user installation having a different type of organizational structure.

The best way to determine whether in-house incompatibility may be a problem is to contact other previous and present users of the package with similar usage profiles to your own and to discuss their experiences with respect to compatibility issues.

In other situations, the incompatibility may be simply that the software package solves a somewhat different application problem from the one that needs to be solved. Thus, acquiring an aircraft structural analysis package to perform structural analysis for bridges is a good idea only if we know that the algorithms in the aircraft program are a good match for our class of bridge analyses.

- *In-house expertise.* Although acquiring a commercial software package frees up manpower for other tasks, it also means that in-house software people lose the opportunity to gain development experience in the technical area covered by the software package.

Often, a short-term decision to acquire a software package becomes a long-term decision to rely on outside expertise for a given class of software capabilities. Thus, an organization's long-term needs for in-house expertise in such areas as microprocessors, process control systems, computer-aided design, tax calculations and so on need to be considered as well as the near-term benefits of purchasing the software package.

### Nonprogramming Options

Adapting existing in-house software may be considered as a special case of acquiring an external software package. Practically all of the advantages remain (such as cost savings, earlier payback and manpower savings), and many of the difficulties disappear (procurement delays, lack of in-house expertise, lack of controllability).

Another class of nonprogramming options for improving software productivity is program generators — systems for constructing, or aiding in the construction of, programs out of preexisting pieces.

Various types of program generators exist, such as program libraries, application generators and very high-level languages (VHLL). In fact, relative to the initial usage of absolute binary code for programming, one can consider assemblers, macroassemblers and current higher order languages (HOL) as initial successful steps in developing program generators.

The main classes of program generator capabilities are summarized below in terms of their distinguishing characteristic sets of components, sets of conventions for joining components, user languages and sets of interpretation, configuration and execution capabilities.

**1. Software piece-parts.** These are largely extensions of the standard functions provided within HOLs to perform elementary functions in such areas as text processing, matrix-vector manipulations and input editing, usually in the form of in-line code generated by an extension of an assembler or HOL compiler.

**2. Program libraries.** These generally refer to collections of more extensive data processing capabilities, such as statistical analysis, financial calculations and graphics display generation. These again are typically called as subroutines or external procedures from a HOL program.

**3. Application generators.** These typically consist of a program library that operates in a prestructured context, based on knowledge of a particular application area (for example, display management, inventory control or aircraft flight mechanics). The structure imposed by the particular knowledge domain allows users to generate application programs simply by specifying options, sequences and parameters in a special application-oriented language.

**4. Very high-level languages.** These typically combine the special knowledge-domain structure and program library of the application generator with the power of a HOL and its compiler. Examples are simulation languages, automatic test equipment languages and query languages.

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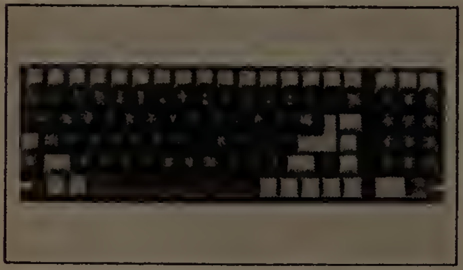

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**5. Automatic programming.** This refers to the ultimate in program generation capability, in which a user begins to specify his desired information processing activity to an automatic programming system, which then asks him questions to resolve ambiguities, clarify relationships and converge on a particular program specification. The system then automatically generates a program that implements the specification. Outside of some very restricted-domain systems that are more accurately termed application generators or VHLLs, automatic programming systems are still somewhat beyond the current frontier of the state of the art.

### Productivity Advantages Of Program Generators

The major productivity advantage of program generators is that sizable computer applications can be generated using a very small number of user-language directives. Developing software via program generators can certainly be a far more cost-effective pursuit than developing software one instruction at a time.

However, it is essential to consider whether the generated program is actually going to solve the problem at hand. If it does, the user reaps the benefit of a large labor savings. If it does not, though, the company may simply reap larger problems.

A number of programs developed with application generators have resulted in making some unanalyzed operational bottlenecks (such as in data preparation and validation) worse than they were originally. Although the software development effort was reduced, the end result was to increase operating costs, decrease reliability and quality of service and decrease staff morale.

Thus, the existence of a program generator for a given application does not imply that all software problems in that area are solved. The user still needs a good deal of front-end effort to ensure that the program generator will generate the right program.

One clear advantage of the program generator in this regard is its value in developing quick prototypes of a desired software capability, on which assumptions about system usage can be tested by actual use. If the resulting software is somewhat off the mark, but can be corrected within the domain of the program generator, the user will achieve a significant manpower savings. And even if the use of the prototype convinces the user that it needs to build a new product, the user has learned that lesson much more cheaply than it would have by building the software from scratch based on faulty assumptions.

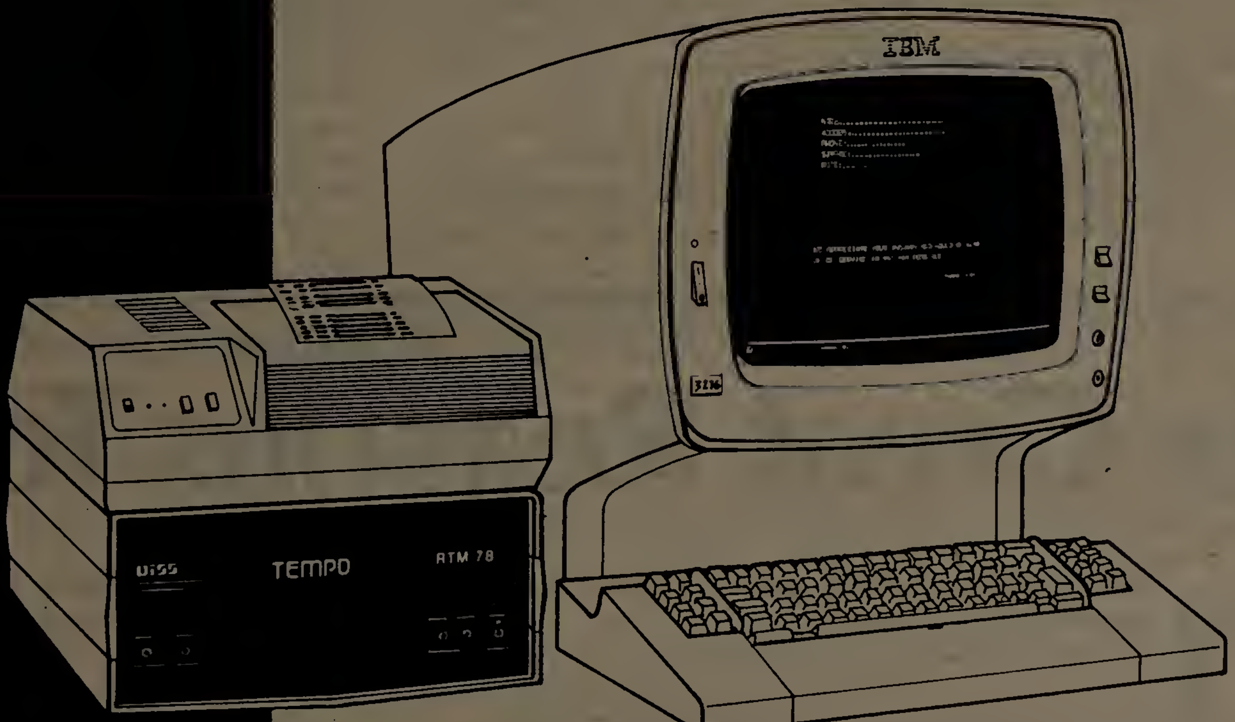
In sum, although it is inadvisable to apply a program generator without some initial analysis of its applicability, it is equally inadvisable to reject the program generator option (or the software package option) with a wave of the hand and an assertion that "our problems are so special that we need custom software." More and more frequently, this will not be the case. Often, just a few inessential compromises in a user's mode of operation will make a program generator product or software package an adequate match for its needs.

Along with the program generators have come advertising claims of extremely high productivity rates in terms of delivered source instructions per man-month (DSI/MM). These claims may be literally true, but they need to be interpreted with a good deal of perspective and caution.

As early as the mid-'50s, it was possible to use an aerospace trajectory-simulation program generator to generate a 10,000-DSI program within 10 minutes of effort.[4] The literal productivity rate for such a program is:

$$\frac{10{,}000\text{ DSI}}{10\text{ min}} \cdot \frac{60\text{ min}}{\text{hr}} \cdot \frac{152\text{ hr}}{\text{MM}} = 9{,}120{,}000\text{ DSI/MM}$$

Figures such as this cause people to claim that the whole concept of DSI/MM as a productivity metric is meaningless. And certainly it is, if it is taken completely out of context — as it is here, since the 10,000 instructions will be generated whether the user needs them all, needs only a small part of them or does not need them at all.



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In general, in dealing with software packages or program generators, the DSI/MM metric is not of much help in analyzing decision situations. The cost-effectiveness comparisons involved in software-package or program-generator decisions are better expressed in terms of mission-relevant benefits provided vs. overall contribution to cost, and DSI/MM considerations do not enter the picture.

In dealing with software development decisions, however, the DSI/MM metric is very helpful in providing a basis for analyzing decisions on issues such as hardware capacity vs. software productivity trade-offs, effort vs. schedule trade-offs, software tool investment and incremental development options. It is clearly not an ideal productivity metric even for software development issues, but it is better than any other candidates currently available.

Some conclusions from this discussion are the following:

- The best criterion for the value of a metric is the degree to which it helps the user make decisions.
- The value of a metric thus varies, depending on the decision-making situation in which it is applied.

In the following section, we assess the effect of various cost-driver attributes on software development productivity to provide a basis for decisions on improving productivity in software development projects. Within this context, the use of DSI/MM as a productivity metric will be quite helpful.

### *Software Productivity Controllables: Personnel Attributes*

Personnel attributes and human relations activities provide by far the largest source of opportunity for improving software productivity. The combined Cocomo productivity range for analyst capability and programmer capability is 4.18 (that is, all other factors being equal, a 90th-percentile team of analysts and programmers will be about four times as productive as a 15th-percentile team). The combined Cocomo productivity range for applications experience, virtual machine experience and programming language experience is 2.52, also very high.

Further, there are a good many different ways in which an organization can capitalize on these high productivity ranges in order to improve software productivity. These are discussed below within the primary categories of staffing and management.

Most important, these "people factors" provide us with a means for keeping software productivity in context with respect to our overall human relations goals, which emphasize a concern for the objectives of the people involved in the software process as well as a concern for the objectives of the software process itself. Fortunately, as we will see below, these objectives are not in much conflict when we take a long-term view: actions that advance people's long-range career objectives also enhance an organization's long-term software productivity.

#### 'Average Coder'

The tremendous range of variability between individuals in software productivity (up to 26:1)[7] provides an outstanding opportunity for an organization to improve its software productivity via staffing initiatives. Most organizations do not take much advantage of this opportunity, as evidenced by a survey of 14 large industrial and government software installations.[8] This survey produced the following profile of the "average coder" at these installations:

- Two years' college-level education.
- Two years' software experience.
- Familiar with two programming languages.
- Familiar with two software products.
- Generally sloppy, inflexible, introverted, "in over his head" and undermanaged.

With a little initiative, any software installation should be able to improve its staffing situation considerably above this level, with significant gains in productivity.

#### Staffing Principles

Following the pattern of organizing management guidelines along the lines of basic principles,[9] five basic principles of software staffing are presented and discussed below:

1. The Principle of Top Talent.
2. The Principle of Job Matching.
3. The Principle of Career Progression.
4. The Principle of Team Balance.
5. The Principle of Phaseout.

The first two principles are discussed below; the others are discussed elsewhere.[5]

1. *The Principle of Top Talent: Use*

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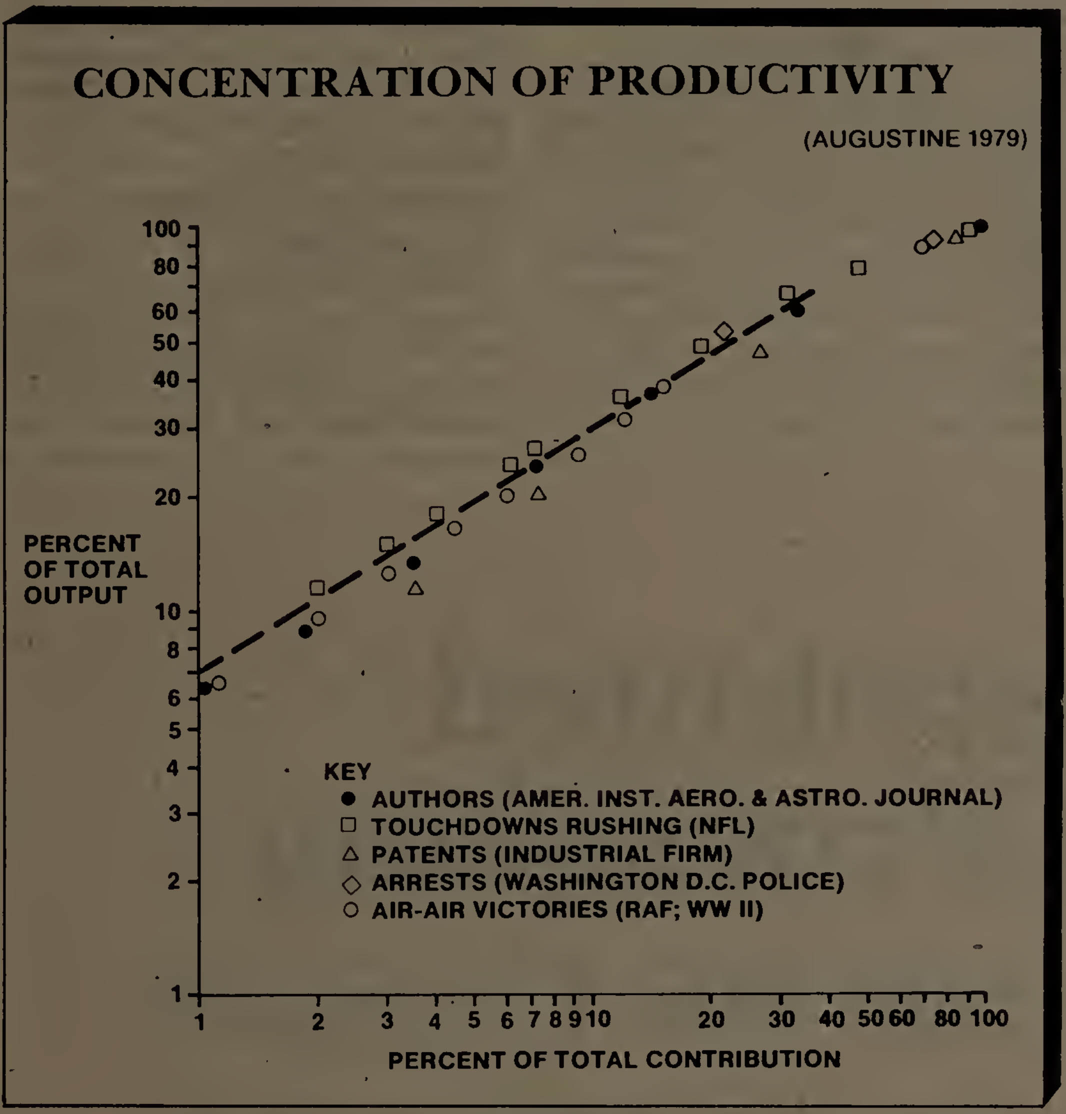
*better and fewer people.* The wide productivity ranges among software personnel shown in Grant and Sackman's study[7] and others are simply special cases of a well-known human phenomenon: The bulk of the productivity comes from a relatively small number of participants. Figure 5 shows the remarkably similar concentrations of productivity found among authors, football players, inventors, policemen and pilots: The top 20% of the people produce about 50% of the output; the bottom 50% of the people produce about 20% of the output.


CONCENTRATION OF PRODUCTIVITY

(AUGUSTINE 1979)

Figure 5

Given this concentration of productivity in a relatively small fraction of people and the additional productivity bonus of reducing project communications overhead by using fewer, more productive people, one would expect every software manager to follow the Principle of Top Talent. But surprisingly, very many do not. Given a choice between a $40,000/year analyst and a $25,000/year analyst, they will inevitably choose the latter, independently of any considerations of the analysts' relative talent, because: "I can't afford those high-priced people," or "I can't take a risk on somebody that expensive."

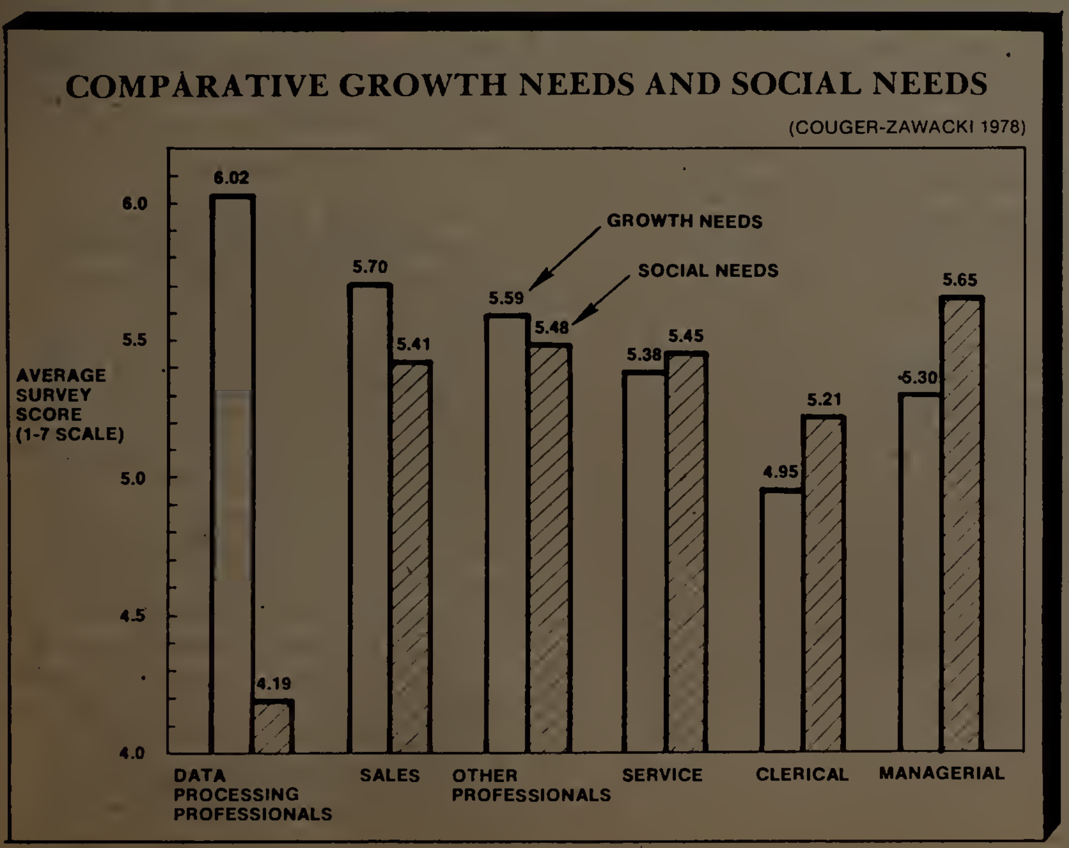
2. *The Principle of Job Matching: Fit the tasks to the skills and motivation of the people available.* One of the common violations of this principle is the Peter Principle: *In a hierarchy, every employee tends to rise to his level of incompetence.*[11]

The most common realization of the Peter Principle in software engineering is the practice of "advancing" good programmers by promoting them into management. Sometimes this works well, but overall it produces more mismatches, frustrations and damaged careers in software engineering than in other fields. The reason for this is shown in Figure 6. This figure compares the relative "growth need" (for skill growth in one's professional discipline) and "social need," for people in data processing and in other job categories such as clerical, sales, service, management and other professions, such as law and medicine.

It is clear from Figure 6 that on the average, the DP professional's social need is extremely low in comparison with his growth need, while the relative ranking of these needs is in the opposite direction for managers.

This comparison indicates that the practice of rewarding good performers by making them managers is more likely to invoke the Peter Principle in the DP field than elsewhere. This point has been realized by a number of organizations, which have instituted dual or multiple career paths culminating in "supermanager."

However, one still sees sources advising exactly the opposite. For example, the book *Data Processing Organization and Manpower Planning*[13] contains a number of the old career progression diagrams which equate career advancement and transition into management.


COMPARATIVE GROWTH NEEDS AND SOCIAL NEEDS

(COUGER-ZAWACKI 1978)

Figure 6

Of course, the Principle of Job Matching applies to other dimensions as well, such as in matching programming, debugging, customer relations and communications skills to programming and systems analysis jobs.[14]

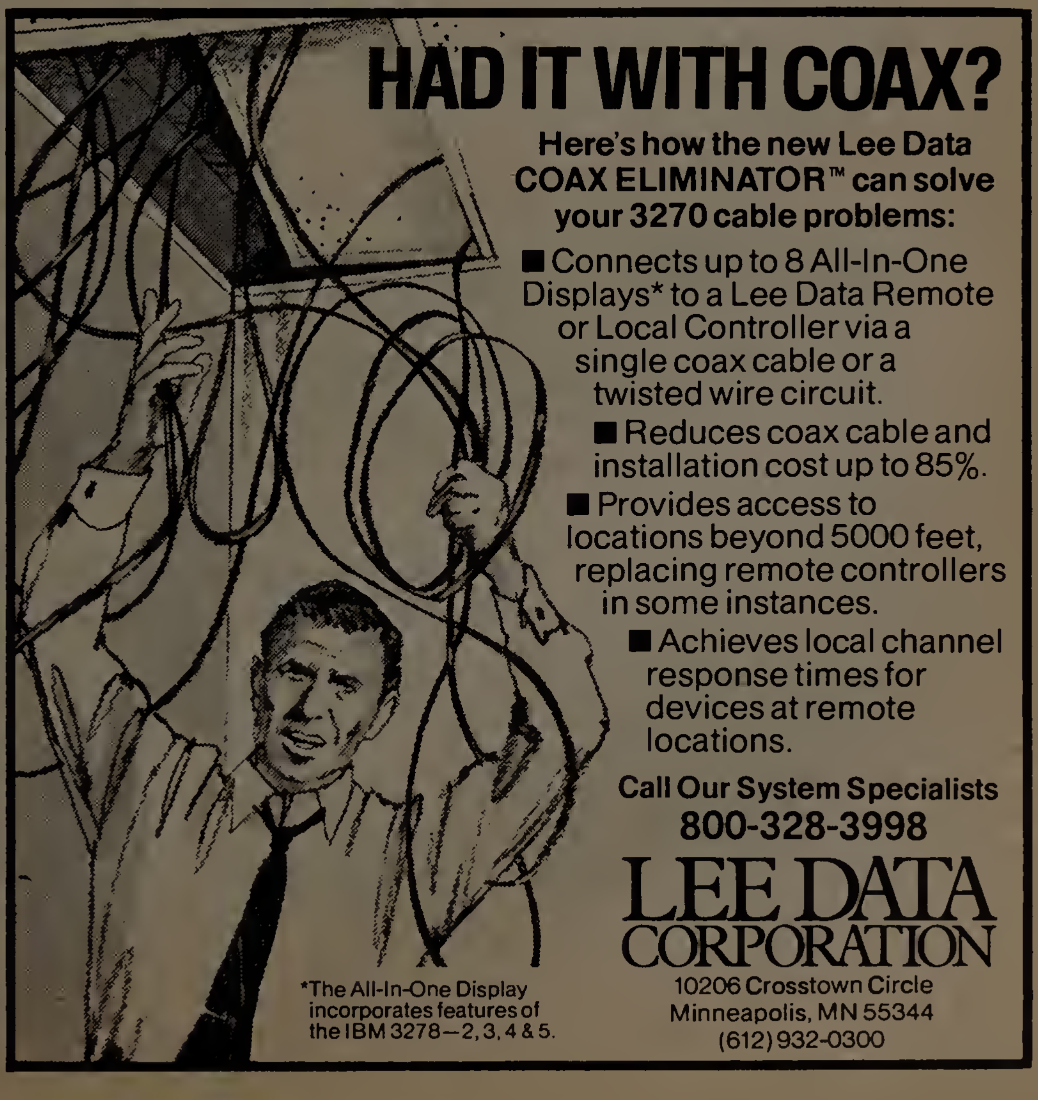
### Management Influence

Poor management can increase software costs more rapidly than any other factor. Particularly on large projects, each of the following mismanagement actions has often been responsible for doubling software development costs:

- Assigning the wrong combination of people to project jobs.
- Creating task overlaps and gaps through poor organization, delegation and talk monitoring.
- Destroying people's motivation by providing unnecessarily poor working conditions and failing to reward good performance.
- Bringing large numbers of people onto the project before there is a clear understanding of their responsibilities.
- Failing to prepare needed resources: computer time, terminals, communications, test data, support software.
- Failing to validate software requirements and design specifications and to identify and resolve high-risk elements early.

Conversely, good management can promote both an efficient, well-coordinated software process and the high levels of staff capability, motivation and teamwork that lead to outstanding software productivity.

It is difficult to summarize the many principles of good overall soft-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ware management. The best sources for such information are Koontz and O'Donnell's *Principles of Management*,[9] Metzger's *Managing a Programming Project*[15] and Brooks' *The Mythical Man-Month*.[16]

### Above All . . .

However, we need to emphasize one point about software management and productivity which dominates all the others: *If managers do not genuinely want improved software productivity, the organization will not get improved software productivity.*

No matter how big the ballyhoo at the beginning of a productivity improvement effort, if the managers do not demonstrate continued commitment to the effort via investment in better tools, recognition and rewards for outstanding performance and enforcement of standard practices, the entire productivity effort will degrade into an empty exercise. Managers must also stop saying, "I know you need three months to do the top-down design right, but the customer wants to see some early progress, so we're scheduling the product design review in a month."

## *Software Productivity Controllables: Project Attributes*

In this section, we will cover two of the three Cocomo project attributes shown in Figure 4, modern programming practices and use of software tools, along with two additional project attributes: requirements volatility and work environment.

### Modern Programming Practices

As used in the Cocomo rating scales, modern programming practices consist of the following:

- Top-down requirements analysis and design.
- Structured design notation.
- Top-down incremental development.
- Design and code walk-throughs or inspections.
- Structured code.
- Program librarian.

In addition, the program support library is an integral part of the program librarian function. The "chief programmer team" concept, which is often associated with the above techniques but which has had mixed results, is not included. Other modern techniques such as ISDOS, SREM, SADT, information hiding, data-directed design and structured design are considered as extensions to top-down requirements analysis and design and structured design notation.[17-22]

Frequently, and somewhat misguidedly, the entire subject of software productivity improvement is identified with the implementation of modern programming practices. As we have seen, there are numerous other ways to improve software productivity, many of which have a greater productivity range than the Cocomo productivity range of 1.51 associated with these programming practices.

However, the introduction of modern programming practices makes it easier to realize many of the productivity improvements from other sources (tools, interactive development, motivation, management). Also the Cocomo maintenance productivity ranges for such practices are considerably greater, varying from 1.54 for small (2-KDSI) projects to 2.07 for very large (512-KDSI) projects. Thus modern programming practices are a very high leverage factor on the life cycle costs of large software products.

### Putting Them to Work

The best sets of guidelines on how to implement modern programming techniques in an organization are those in Yourdon's *Managing the Structured Technologies*[23] and Infotech's *Structured Programming: Practice and Experience*.[24] Detailed checklists and representative experiences can best be obtained from these sources; below is a set of general guidelines for implementing these programming practices.

1. Ensure that management is committed to the implementation effort.
2. Embed the implementation within an overall strategy for improving software productivity.

- Include other options such as computer capabilities, work environment, staffing and career develop-

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ment.

- Include such features as a productivity agent, an implementation study, a productivity plan, a training program, a pilot project, an incremental implementation approach and an evaluation and improvement activity.

3. Make sure that both managers and performers agree on an appropriate set of objectives and performance criteria:

- Clear, adaptable software rather than complex, hyperefficient software.
- Public rather than private software.
- Thorough, validated requirements and design specifications rather than early code.

4. Do not implement all the techniques at once. One effective three-step approach is the following: (a) structured code and walk-throughs; (b) top-down requirements analysis and design, structured design notation and top-down incremental development; and (c) program library, librarian and other team/organizational changes.

5. Allow enough time for training. Make sure that performers understand the objectives and principles of the new techniques as well as the rules.

6. Make sure the techniques are consistently applied. Verify compliance and reject noncompliant work.

7. Avoid "structured purism." Occasionally, a GOTO or an extra-large module is the best way to do the job. Do not confuse means and ends.

8. Do not be afraid of mistakes and false starts. They are part of the learning and assimilation experience.

9. Do not expect instant results. In fact, be prepared for some reduction in productivity during the training and assimilation period.

10. Establish a continuing evaluation activity with feedback into improving the techniques used.

### Use of Software Tools

The Cocomo productivity range for "use of software tools" is 1.49. Thus, tools provide a significant opportunity to improve productivity, particularly since an organization's tool support is one of its more controllable factors. A difference of one step on the five-step Cocomo tools rating scale in Figure 2 can make a difference of about 10% in productivity. For a large organization with, say, 200 software people, this means freeing up 20 software people for new activities, a payoff worth a significant level of investment.

Further, as with modern programming practices, the use of software tools can make it easier to realize productivity improvements from other sources such as modern programming practices, interactive development, motivation or management. Below are some guidelines for various situations in which the level of tool support may provide a good opportunity for improving software productivity.

- If your current facility is strongly tool-deficient, consider acquiring an integrated software tools capability. For example, several versions of the Unix Programmers' Workbench capability are available as commercial products.[25]
- If your current facility has a well-integrated set of tools, be on the lookout for additional cost-effective tools. Sources of information on available tools are given below.
- If you are planning to develop a new tool, look carefully at expected costs and benefits (most tools will provide only a fraction of the 10%

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| QUANTITY | COMPUTER A | COMPUTER B |
|---|---|---|
| Purchase price | $5,000 | $10,000 |
| Tools level | very low | low |
| Tools effort multiplier | 1.24 | 1.10 |
| Nominal software effort | 20 man-months | 20 man-months |
| Software effort with tools | 25 man-months | 22 man-months |
| Labor cost @ $5,000/man-month | $125,000 | $110,000 |
| **Total Cost** | **$130,000** | **$120,000** |

**Table 2. Effect of Tools on Computer Selection**

productivity gain associated with a one-step improvement on the Cocomo scale) and consider any commercial tools that may provide similar capabilities.

- If you are choosing a new computer system, particularly a microcomputer, make a thorough cost-benefit analysis of the candidate system's relative tool capabilities. Table 2 shows that the tools differential for even a small (20 man-month) total software effort will outweigh a factor-of-two difference ($5,000 vs. $10,000) in the purchase price of the computer system.
- If you are developing a new computer system for sale, be prepared to commit a significant level of investment in software tools, as customers are becoming more aware of tools effects such as in Table 2.

### Requirements Volatility

One additional factor employed by Cocomo, but not included in Figure 4, is requirements volatility, a measure of the amount of software rework experienced on a project.

Some requirements volatility on software projects is unavoidable (IBM's experience averages 25%). The Cocomo productivity range for requirements volatility is a significant 1.78.

Some large projects with frequent redirection have experienced productivity penalties of factors greater than 4 due to requirements volatility. Thus, reducing requirements volatility is a major avenue for improving software productivity.

The usual source of requirements volatility is a scenario such as the following:

**Customer:** "We've got to reorganize the exception reporting module to feature an outcome prediction capability. We've just heard that the new chief is very big on outcome prediction."

**Software Manager:** "Gee, that sounds interesting. We should be able to put something good in for you there. Let's see — George is working on the exception reporting module. We'll have Joan help him take a crack at it. Joan is currently working on the scheduler. She's very good at problems like this."

Particularly if Joan's scheduler is on everybody else's critical path, the software manager has just introduced a major slowdown on his project without any renegotiation of budget and schedules.

The best way to keep the sources of requirements volatility down to the necessary ones is to:

1. Establish a formal or informal "contract" between the customer and the software developer such that any proposed change with budget and schedule impact requires a budget and schedule renegotiation.
2. Establish a user "wish list" for recording candidate improvements to be considered for future releases of the software product and a means of establishing the cost-benefit priority of wish-list items for future releases.

It is remarkable how frequently the prospect of a budget and schedule renegotiation turns a "must have" change request into a "nice-to-have" wish-list entry.

### Work Environment

Besides the psychological work environment of an organization, the physical work environment is a significant influence on software pro-

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ductivity. Anyone who has attempted to develop good software efficiently in a hot, noisy, overcrowded programming bull pen with poor clerical and telephone support, awkward work procedures and computer access, inadequate supplies and conference facilities and frequent moves will verify that these have a strong negative effect on both motivation and productivity.

Work conditions tend to act as a Herzberg "hygiene" factor: Above a certain threshold, they are not a powerful motivator, but below that threshold they are a powerful demotivator. If conditions become too bad, more people will quit, leaving the organization with a personnel continuity problem as well.[26]

> *'Anyone who has attempted to develop good software efficiently in a hot, noisy; overcrowded programming bull pen with poor clerical and telelphone support, awkward work procedures and computer access, inadequate supplies and conference facilities and frequent moves will verify that these have a strong negative effect on both motivation and productivity.'*

The most significant attempt to provide a work environment suited to the needs of software people has been the architectural design and development of the IBM Santa Teresa Laboratory.[27] The buildings, offices, furnishings and electrical and telephone connections of the Santa Teresa Laboratory were designed to meet, as much as possible, a set of requirements derived from studies of software development activities, including such items as:

- *Communication.* Facilities for intraproject communication (for example, office proximity, conference rooms) and external communication (voice and data telecommunications).
- *Privacy.* Personal offices with acoustical isolation, adequate ventilation, external awareness (windows) and individual control of the office environment.
- *Furniture.* In particular, work surfaces and storage compartments that accommodate the use of computer listings.
- *Computer connections.* Terminal connections for every office and easy project access to video, high-speed and low-speed communications, to remote job entry stations and to hard-copy devices.
- *Security.* Controlled access to the site, to data processing facilities and to project facilities.
- *Technology.* Flexibility to accommodate future computer and software technology advances (for example, broadband teleconferencing, powerful personal terminals).

Several other organizations have recently eastablished similar work environments and have concluded that the new environment is proving to be a positive influence on productivity, personnel satisfaction and personnel retention. Not every organization will have a chance to specify an entire building complex to meet software personnel needs, but every organization will have some opportunities to evolve toward a better-matched software work environment. At the very least, we should be able to match our level of concern for providing a suitable work environment for our software people to our level of concern for providing a suitable work environment for our computer equipment.

### Other Factors

Figure 4 identifies a number of additional factors with significant software productivity leverage: computer attributes such as timing and storage constraints and product attributes such as complexity and required reliability. In the interests of brevity, we must refer readers to *Software Engineering Economics* for a discussion of these factors.

### *Establishing A Software Productivity Improvement Program*

Software productivity improvement programs for different organizations will generally be fairly simi-

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*December 23, 1981*

| COCOMO TOOLS RATING |  | 1981 PROJECTS | PERCENT OF PROJECTS |  |  |
|---|---|---|---|---|---|
| Level | Multiplier |  | 1981 | 1985 | 1990 |
| Very Low | 1.24 | Lab automation, test equipment | 15% | 0% | 0% |
| Low | 1.10 | Process control, communications | 25 | 10 | 5 |
| Nominal | 1.00 | MIS, inventory | 50 | 25 | 10 |
| High | .91 | Scientific | 10 | 50 | 25 |
| Very High | .83 |  |  | 15 | 60 |
| Weighted average multiplier | 1.05 | .94 | .88 |  |  |
| Productivity gain |  |  |  | 12% | 19% |

Table 3. Evaluation of Tools Improvement Strategy

| COCOMO ATTRIBUTE | WEIGHTED 1981 | AVERAGE 1985 | MULTIPLIER 1990 |
|---|---|---|---|
| Use of software tools | 1.05 | .94 | .88 |
| Modern programming practices | 1.07 | .89 | .83 |
| Computer response time | 1.02 | .91 | .89 |
| Analyst capability | 1.00 | .88 | .80 |
| Programmer capability | 1.05 | .90 | .80 |
| Virtual machine volatility | 1.06 | .95 | .90 |
| Requirements volatility | 1.27 | 1.08 | 1.00 |
| Use of existing software | .90 | .70 | .50 |
| Cumulative multiplier | 1.46 | 0.43 | 0.19 |
| Productivity gain |  | 3.4 | 7.8 |

Table 4. Evaluation of Overall Productivity Strategy

lar, but an effective program for a given organization will require some specific tailoring to the organization's unique characteristics. The major steps involved in establishing and tailoring a software productivity improvement program are the following:

1. Obtain top management commitment.
2. Establish a software productivity agent.
3. Arrange broad-based participation.
4. Identify objectives, alternatives, constraints.
5. Evaluate alternatives.
6. Choose the best combination of alternatives.
7. Prepare a phased implementation plan.
8. Obtain authority to proceed.
9. Implement plan.
10. Follow up, iterate plan.

Each of these steps is elaborated below.

1. *Obtain top management commitment.* We discussed the need for this step above under "management." The major conclusion there was:

- If managers do not genuinely want improved software productivity, the organization will not get improved software productivity.

2. *Establish a software productivity agent.* This step follows a basic management principle: *If you want to get something to happen, make somebody specifically responsible for it.* The productivity agent serves as a dedicated focal point for productivity-related activities. Because of their close interrelationships, it is generally a good idea to include software cost estimation and software data collection and analysis activities as part of the productivity agent's charter.

Under such a charter, the productivity agent's primary responsibilities would be to:

- Identify potential productivity improvement avenues.
- Evalute candidate productivity improvement proposals.
- Evaluate external productivity aids.
- Perform or review software cost estimates.
- Collect and analyze software cost/productivity data.
- Serve as a corporate memory and consultant on productivity-related issues.

The major job qualifications for a software productivity agent are a good knowledge of software and the organization, quantitative analysis skills and a strong desire to help people improve their productivity. Organizationally, the best location for the productivity agent is in a staff position reporting to the highest level manager responsible for software development. Again, however, without this manager's strong commitment to improving productivity, the agent's effect will be minimal.

3. *Arrange broad-based participation.* Improving software productivity inevitably involves making changes. If you arrange for everyone who will be affected by these changes to become a part of the definition and planning of the changes, you achieve two main advantages:

- *You stimulate people's enthusiasm rather than their resistance.*
- *You get a more accurate assessment of the environment.* Figure 7 shows the results of a recent survey conducted as part of a software productivity improvement effort. A sample of upper-level managers, middle managers and performers were asked,

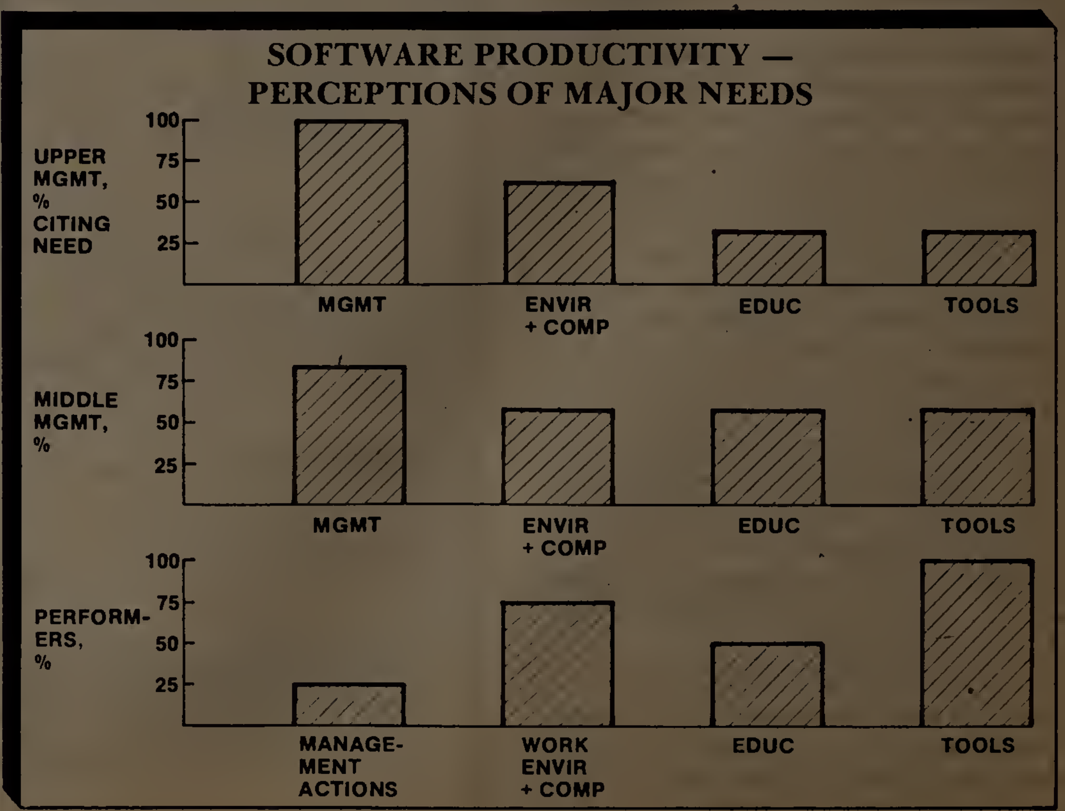

Figure 7

OEM EUROPE MEETS AT THE INVITATIONAL COMPUTER CONFERENCES

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"What should we do to improve software productivity?" Their answers were classified as to whether the suggestions involved project management actions (better planning, organization and so on), work environment and compensation (better office space, facilities, performance bonuses and the like), education and training (in modern programming practices or management, for example) or acquisition of software tools.

It is evident from Figure 7 that the upper managers' world view conditions them to see management actions as the high-leverage items. The important point is not which group is more correct, but that each group brings a valid set of perceptions to bear on the problem.

Further, since motivation is such a key factor in software productivity, people's perceptions are an important consideration. If the upper managers in the organization had proceeded with a big campaign to improve project planning, organization, reporting and so on without providing the performers with improved tools, the organization's resulting productivity gains would not have been anywhere near their potential.

4. *Identify objectives, alternatives, constraints.* A good statement of an overall productivity improvement objective is this: Find ways of producing an equivalent level of desired software functionality at a reduced cost, with no loss in product quality and with an improved set of staff career options.

Besides this basic objective, installations may have specific objectives reflecting greater needs to improve productivity on large projects or to improve computer center services concurrently, for example. The alternatives to be considered are all those controllable factors discussed previously. The organization's constraints may include manpower ceilings, investments in existing hardware and software inventory, office space limitations or government regulations.

5. *Evaluate alternatives.* Here the Cocomo tables can be of great value in assessing both the organization's current status and the likely productivity impact of various candidate improvements. For example, Table 3 shows an evaluation of the long-range effects of a plan to improve software tools availability and usage within a given organization. It shows, for each Cocomo level of tool usage, the organization's current (1981) situation in terms of projects operating at that tools level and the overall percentage of the organization's software activity operating at that tools level (here, spread across various classes of tools-rich and tools-poor projects — for example, 15% of the organization's 1981 effort is devoted to laboratory automation and test equipment software projects with very low tools support).

Further, it shows how this percentage profile is likely to change as the long-range tools improvement program is implemented. From these profiles, the weighted average Cocomo tool multiplier for each representative year can be calculated. It shows the organization's average tool factor being reduced from 1.05 to .94 (a 12% productivity gain) in four years and from 1.05 to .88 (a 19% productivity gain) after another five years of tool enhancement.

### Subjective Effects

Of course, as with the other evaluations we studied, the more subjective effects must be evaluated as well as the easily quantifiable ones. Thus, the effects of better tools on people

> *'By far the best results in productivity improvement are obtained by working the whole problem. Simply concentrating on modern programming practices, on management actions or on tools will take away a great deal of the potential productivity synergy of an integrated combination of alternatives.'*

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and their career goals should be assessed as well.

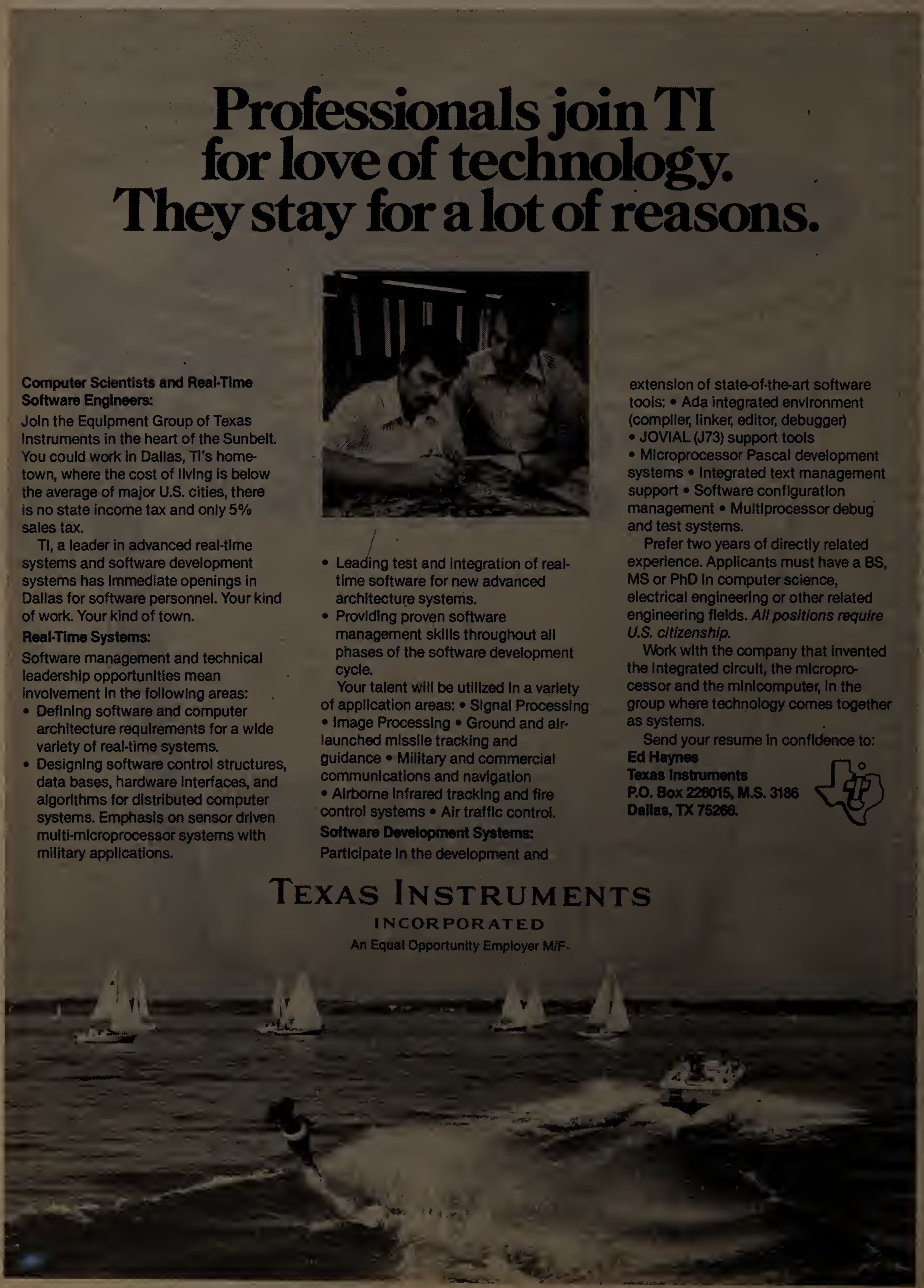
6. *Choose the best combination of alternatives.* Again, by far the best results in productivity improvement are obtained by working the whole problem. Simply concentrating on modern programming practices, on management actions or on tools will take away a great deal of the potential productivity synergy of an integrated combination of alternatives. The evident validity of the Cocomo multiplicative model indicates that the cumulative effects of implementing several alternatives will multiply together the individual productivity improvements such as those calculated for tools in Table 3.

Table 4 (on In Depth/16) shows the result of such a calculation, based on an integrated effort to improve an organization's use of tools, modern programming practices, interactive software development, staffing, work environment and compensation, management procedures and use of already-developed software.

Several significant points can be made about Table 4:

- *An integrated software productivity improvement program can have an extremely large payoff.* Productivity gains by factors of 3 in four years and factors of 8 in nine years are generally achievable and are worth a good deal of planning and investment.
- *Improving software productivity involves a long, sustained effort.* The payoffs are large, but they require a long-range commitment. There are no easy, instant panaceas.
- *An effective productivity improvement program involves much more than introducing modern programming practices.* In the situation shown in Table 4, only a 29% productivity gain would be achieved just from introducing modern programming practices.
- *Evaluating potential productivity gains requires a sound assessment of the organization's current practices.* As seen from Table 3, the fact that the Cocomo tools productivity range is 1.49 does not mean that an organization will get a 49% productivity gain by fully tooling up. Note that Table 3 provides an effective framework for performing such an assessment, if extended to the other Cocomo cost-driver attributes as well.
- *Table 4 actually underestimates the organization's likely productivity improvement.* It does not include gains that would likely be made independently of the productivity program, such as those due to increases in the applications, language and virtual machine experience factors. It underestimates the maintenance benefits of using modern programming practices, and it assumes that no improvements are possible from the hardware constraint and schedule constraint factors.
- *In the very long run, the biggest productivity gains will come from increasing use of existing software.*

7. *Prepare a phased implementation plan.* The plan should be incremental, with the early phases concentrating on the more straightforward, easy-to-implement, high-payoff items such as structured code, walk-



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throughs, stabilizing requirements and virtual machine support. The plan should follow the "why, what, when, who, where, how, how much" format characteristic of project plans and should contain provisions for addressing the entire range of improvements upon which the productivity improvement calculations were based.

8. *Obtain authority to proceed.* The "how much" portion of the implementation plan should identify the resources required for facilities, tool acquisition and so on. "Authority to proceed" includes authority to commit funds for these items. One should not expect threefold or eightfold productivity improvements without the expenditure of some resources.

9. *Implement the plan.* Again, this means "implement the whole plan" and not just the fun parts. Improving productivity by phasing out misfit staff members is not fun, but if you plan to do it and back off, it will erode the progress you may have been making elsewhere, as people begin to wonder what other parts of the program are not for real.

10. *Follow up and iterate plans.* Here also, the Cocomo model and the software project data collection instruments provide a good framework for follow-up. If each project collects and tracks data on its attribute ratings and its productivity, we will have a set of records for determining whether our plans are being implemented, whether the implementation is actually realizing the predicted improvements in cost-driver attribute ratings and whether the improvements in attribute ratings are producing improvements in productivity. Since no long-range plan is perfect, we will undoubtedly find some situations in which plan improvements will be necessary.

It is clear that the implementation of this plan requires a great deal of organizational willpower and staying power. A good source of encouragement and insight is the proceedings of an application development symposium sponsored by the Share and Guide user groups, which contains histories of some organizations that have implemented subsets of this plan with highly successful results.[28]

What do we conclude from the material presented in this article? Here are the key points:

1. *For most data processing installations, software productivity will be the critical problem of the '80s.* The demand for new software is rising much more rapidly than the supply of capable software people.

2. *Most data processing installations can increase their software development and maintenance productivity by a factor of 2 in three to four years and by a factor of 5 in six to eight years.* With such large potential payoffs, every good-sized installation should establish a software productivity improvement program. However, nobody should expect instant results.

3. *The Cocomo cost-driver attributes and effort multipliers provide a natural framework for*

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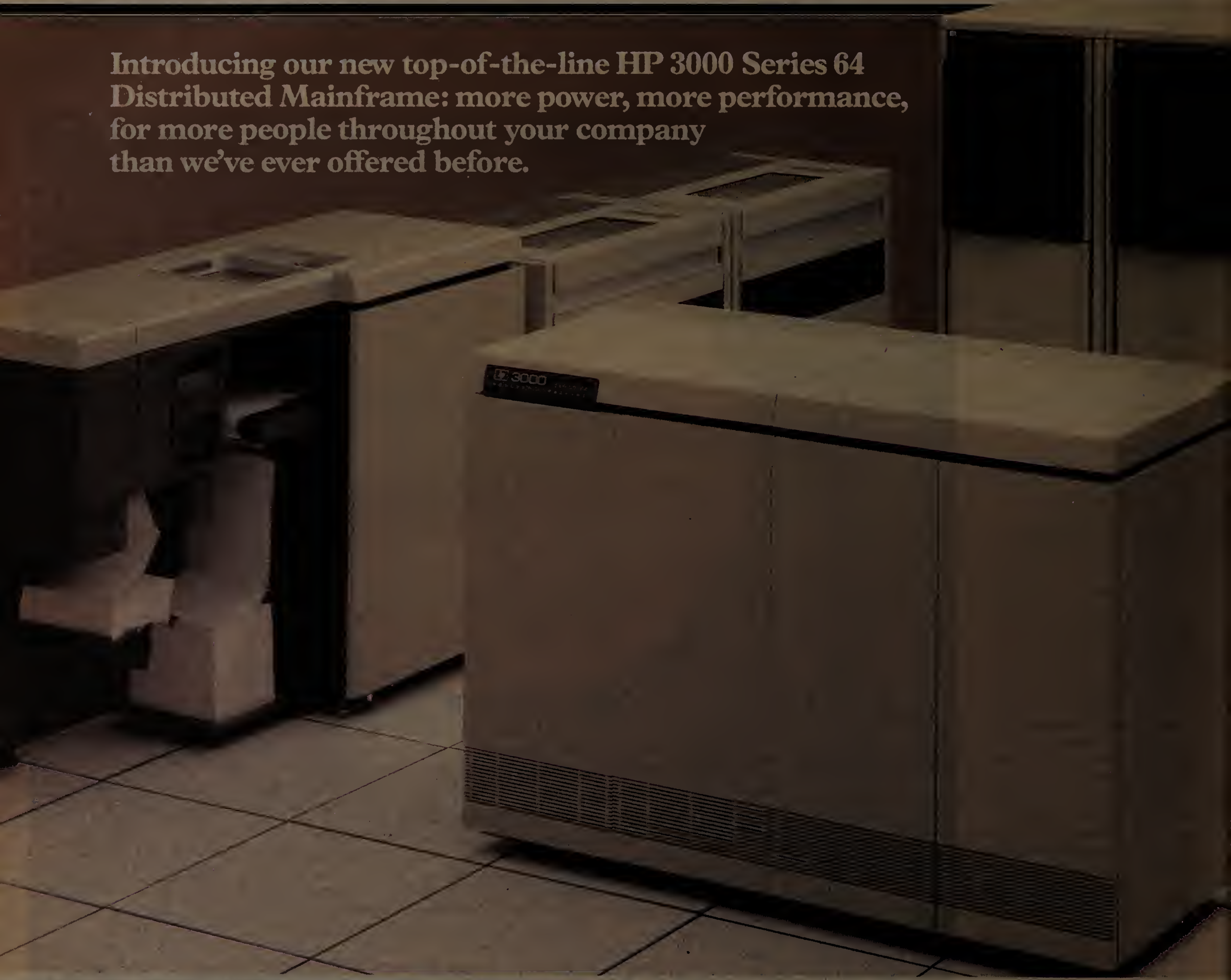

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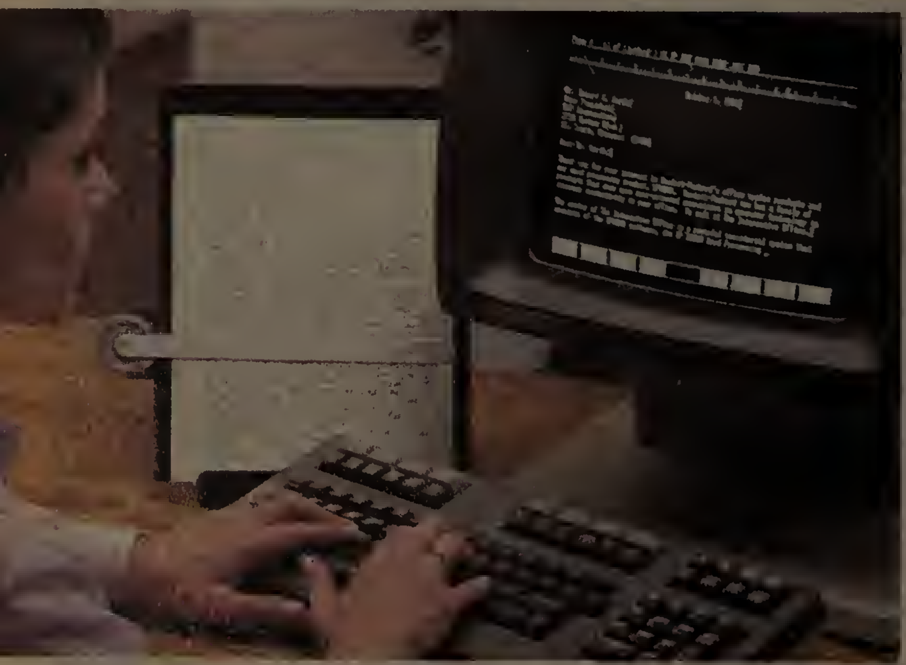

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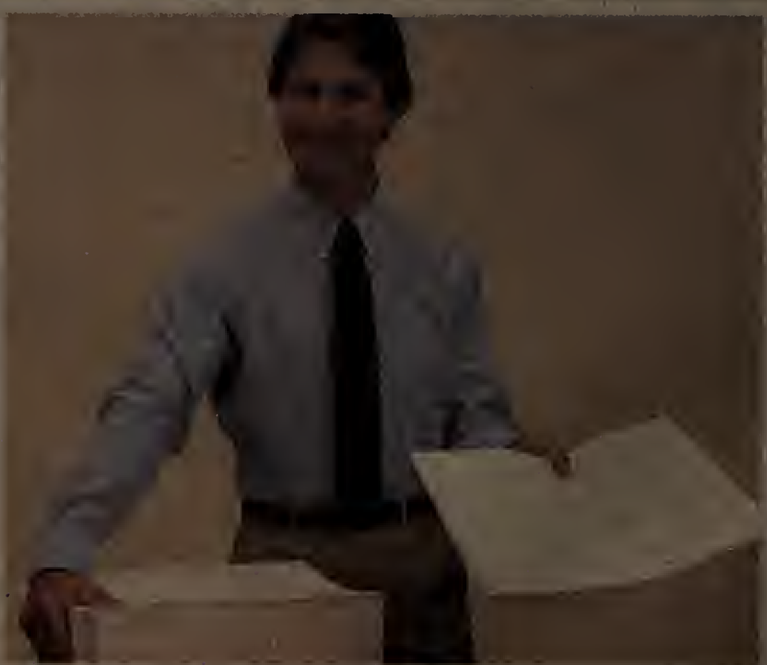

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*establishing and implementing a software productivity improvement strategy.* As was seen in Figure 4, which summarized the productivity ranges of the Cocomo cost-driver attributes, improving software productivity involves pursuing many more opportunity areas besides introducing modern programming practices. In particular, the personnel areas of staffing, motivation and management offer the biggest payoffs.

4. *In the long run, the best productivity program is one that considers both the life cycle of the software product and the life cycle of the software people involved.* For example, this means avoiding such common pitfalls as the Peter Principle.

5. *Software productivity can be improved by a great deal more than the factors cited above via increased use of existing software.* In fact, a more appropriate criterion than "delivered source instructions per man-month" for assessing software productivity improvements would be one expressed in desired software functionality per unit cost.

6. *Significant software productivity improvements are not achievable without the full commitment of higher management.* Some example situations involve establishing significant salary increase differentials for top performers, phasing out misfits, enforcing disciplined practices, holding the line with customers on unrealistic schedule demands or requirements changes and stimulating a higher proportion of "not invented here" software.

7. *The best way to get started on a sustained software productivity improvement program is to establish a software productivity agent.* This agent should be responsible for identifying, evaluating and preparing the way for proposed productivity improvements.

One final point deserves particular emphasis. In pursuing improvements in software productivity, we need to be careful not to confuse means with ends. Improved software productivity is not an end in itself; it is a means of helping people expand their capabilities to deal with data, information and decisions.

Often, helping people to do this will involve us in activities that do not add points to our software productivity scoreboard. For example, we may spend two weeks helping someone find an effective non-software solution to his problem. At such times, we need to recall that the software productivity scoreboard is just one of the many ways we have to gauge our progress toward becoming more effective data processing professionals.

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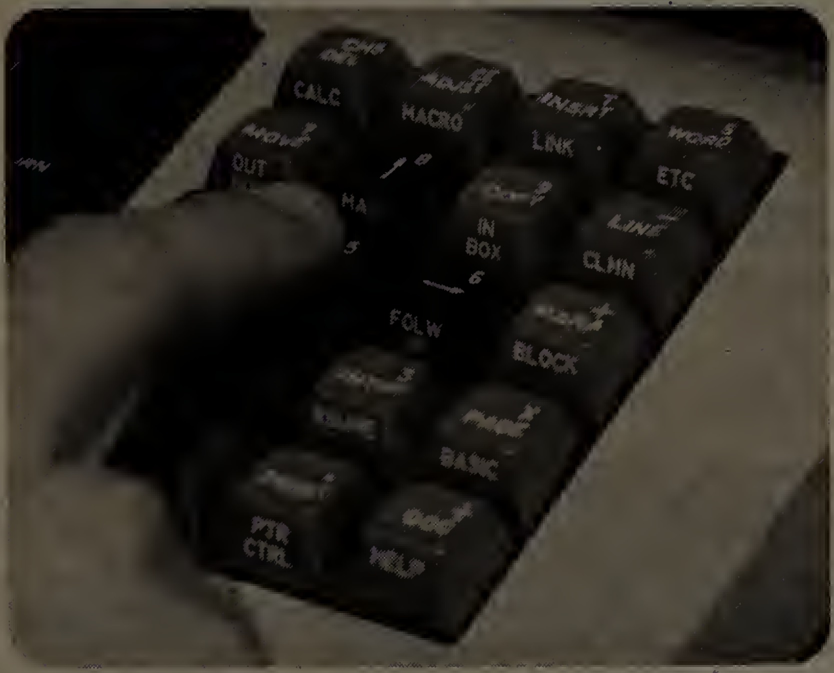

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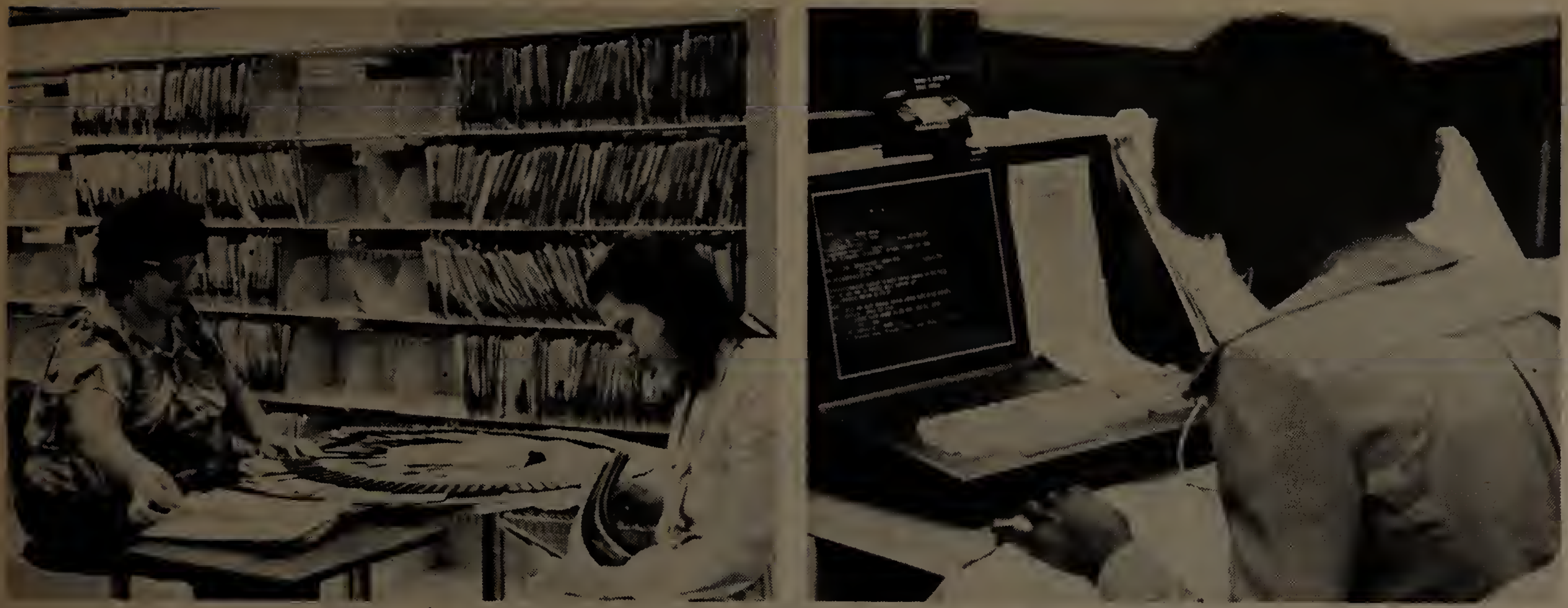

**Paper sorting and filing (left) is being phased out at USAA as the ACE system replaces paper records; putting claims reference information at the claims handler's fingertips (right) has reportedly eliminated 95% of the paperwork in processing most claims.**

# System Easing Claims Handlers' Jobs

SAN ANTONIO, Texas — The United Services Automobile Association (USAA) has a computer-based retrieval system that is said to allow the company's claims handlers to do 95% of their work without referring to paper files.

What's more, the system — called Automatic Claims Environment (ACE) — has boosted overall productivity by about 15%.

The system, which began in early 1979 and became fully operational this year, revolves around three mainframes installed here at the firm's headquarters. The computers are two IBM 370/3033s and an IBM 370/158. Tied into the main computers are 12 Datapoint Corp. Attached Resource Computer (ARC) systems, supported by 23 disk drives.

USAA provides each claims handler, manager and supervisor with a terminal — a Datapoint 3800 series information processor — that connects to the main computers through the ARC minicomputers.

USAA's purpose in going to an all-electronic information system was to provide speedier service to its clients: military officers and former officers and their families who carry auto, life and various types of property insurance.

Although it is the eighth largest private passenger automobile insurer in the country, the organization has no sales agents in the field. All business is handled by telephone or mail through the San Antonio home office and six regional service offices, Robert McDowell, a senior systems analysts with the firm, said.

"We don't know of any other insurance companies who are taking all loss information data on the keyboard, while putting all documentation and reference into magnetic storage," McDowell said. "With this system, we don't have to make a client wait a day while we pull the file."

McDowell believes that most insurance companies are now at the same point USAA was formerly. That is, they can confirm that a person is covered by a policy, determine the policy amount and then issue a draft that is tied to the claim number.

"But, at some point, they all have to go to paper records, which means you'll have some

*(Continued on Page 64)*

# Relational Data Base System Announced for Net Environments

OMAHA, Neb. — HDR Systems, Inc. has announced a multiprocessor attached-resource relational data base system for network environments that provides data base capabilities through a hardware/software implementation of the relational data model and associated query languages.

The system, called Noah, consists of two primary processor groups: the Query Processor and the Database Machine. The Query Processor consists of multiple independent query processors and a redundant controller linked via a bus. As queries are received from the network, they are assigned to an available processor for translation, then passed to the data base processor group.

The Query Processor accepts results of data base accesses, formats them and puts them back into the network.

Up to 24 processors can be added to a single system to meet a user's specifications, a spokesman said.

The Database Machine is made up of five components: the data base I/O channel, the Database Processor, a random-access memory cache, a data base accelerator and a data base disk controller.

Noah is available in two versions: one that acts as an attached data base management system to Datapoint Corp.'s attached-resource computer network and another which acts as a channel interface between Noah and Control Data Corp.'s Cyber processors.

High-level language interface preprocessors to provide Noah access from Cobol are provided for both the Datapoint and CDC environments.

Noah will be available the first quarter of this year and costs from $300,000 to $500,000 for a typically configured system. However, the ultimate size of the system depends upon the size of the user's data base, the spokesman said.

HDR Systems is located at 8404 Indian Hills Drive, Omaha, Neb. 68114.

### *Predicting Future Demands — Part 2*

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**By Leon G. Rittenhouse**
Special to CW

*This is the second half of a two-part series.*

Like people, no two computers are exactly alike.

For instance, although manufactured by the same company, an IBM 3033S does not have the same capabilities as an IBM 4341. Nor do both machines require the same amount of time or resources to process data, which makes its difficult, if not impossible, to measure the total "CPU minutes" spent processing work if both systems are installed on the same floor.

To overcome the problem of incompatible work load measurements, it is necessary to translate the CPU times of both systems into a common unit of measure that represents comparable levels of work. A simple way of doing this is by translating the CPU minutes into millions of instructions (Mins).

Before arriving at a reasonably accurate Mins figure, you multiple the machine's millions of instructions per second (Mips) rate by 60 (seconds), translating it into millions of instructions per minute (Mipm). The Mipm can then be used to translate CPU minutes into Mins, which are a common unit of measure for processing work load, and can be combined across various CPUs.

For example, an IBM 3033S

*(Continued on Page 64)*

| YEAR | ACTUAL AND PROJECTED MINS PER DAY* | REQUIRED MINS** PROCESSING | REQUIRED MIPS*** RATE |
|---|---|---|---|
| 1980 | 102,344 | 90.67 | 1.52 |
| 1981 | 113,716 | 101.08 | 1.68 |
| 1982 | 142,200 | 126.40 | 2.11 |
| 1983 | 177,700 | 157.96 | 2.63 |
| 1984 | 230,900 | 205.24 | 3.42 |
| 1985 | 300,200 | 266.84 | 4.45 |
| 1986 | 395,300 | 351.38 | 5.86 |

* 1980 and 1981 are actual figures for a computer system that averaged 34 minutes of idle time per day. Processing work loads include both programs and operating system.
** Millions of instructions.
*** Millions of instructions per second.

**Processing Requirements Projection**

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# Mins Gauges Work Load of Different CPUs

*(Continued from Page 61)*

has an approximate Mins rating of 2.67 Mins. When multiplied by 60, that figure becomes 160.2 Mins/CPU minute.

The IBM 4341 has an approximate Mins rating of .82, which when multiplied by 60 becomes 49.2 Mins/CPU minute.

These final figures can be used to find out exactly how much processing time is taken up by each type of CPU. For instance, 10 minutes on the 3033S translates into 1,602 Mins (160.2 x 10), while 10 minutes on the 4341 is 492 Mins. When added together you get a total processed work load of 2,094 Mins.

This Mins figure can be compared through time even when CPUs are changed within the time period being observed. It can even be compared across shops using different CPUs with different Mins ratings.

### Equation Reversed

The equation can be turned around to figure how a certain work load would be processed on a future CPU. For example, if the 2,094 Mins work load were applied to a CPU with a Mins rating of 2.4, it would take 14.5 CPU minutes to run.

By keeping historical data on the processing work load in terms if Mins, then forecasting the future growth of a system's Mins, it is relatively simple to predict the processing power needed to handle predicted work loads. (See chart on Page 6.)

Work load projection can be derived by forecasting each application or system and adding the figures to get an overall total. Using these projections, it would be reasonable to make a four-year commitment on a 5 Mins machine or a two-year commitment on a 3 Mins system.

The Mins formula can be especially helpful when combining work loads from multiple computers each of which runs at a different Mins rate. Multicomputer environments are becoming more numerous and there is a growing awareness of the need for a common unit of work load measurement.

Finally, rating future computer needs with Mins has a distinct advantage when communicating with nontechnical people. It can be plotted on volume charts and understood by those familiar with millions of dollars and millions of ounces rather than millions of bits of computer data.

*Rittenhouse is a technical service manager with McCrory Stores in York, Pa.*

# Claims Handlers' Jobs Eased

*(Continued from Page 61)*

delays," McDowell stated.

The ACE project began with the selection of two test regions, one representative of automobile claims and the other property claims. USAA's programmers developed the software with the assistance of Datapoint personnel.

At the end of five months, the system passed its management review. And in approximately 15 months, the project had met all the test criteria and was approved as operational.

### Involving Users in Design

One key to the system's success, McDowell explained, was in bringing the users into the software design and planning from the very beginning of the project.

"We sat down with representative claims handlers and asked, 'What can we do for you? What do you need to do in order to do your job without paper?' "

Another key phase in ACE was hardware selection. The firm reportedly looked beyond the initial claims handling function to several more functions that will add even more to the firm's productivity, McDowell said.

Proposed functions include electronic mail; supervisory-management communications, both vertically and horizontally; region-to-region communications; and calendar files that will automatically alert claims handlers to actions to be taken at specific times.

To back up these new functions, the firm is already in the process of expanding its system. A $4 million order with Datapoint calls for a total of six ARC systems, totaling 480 processors, to be installed in the home office. And six more systems will be installed in the firm's regional offices in San Diego; Colorado Springs, Colo.; Fairfax, Va.; Tampa, Fla.; and Atlanta.

The regional systems vary in size from 20 to 78 user terminals, McDowell pointed out.

The USAA project has currently reached the point where ACE is daily replacing claims handler's files with information in the computer bank. Now, in a single call, a client can make a claim and have it verified; then payment is ordered and placed in the mail overnight.

McDowell believes that this is just the beginning.

"As we learn more about distributive data processing and use of inteligent terminals, and as the users become more aware of the kinds of things they can do and we can do together, the growth becomes algabraic," he said.

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All the B Series were designed with the operator in mind. The long lasting ribbon cartridges are easy to load. The bands can be changed in less than a minute. Sophisticated self diagnostics let the operator identify problems and often correct them without a service call.

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**With Dataproducts' B-1000™ Band Printer, every department gets what's coming to it.**

# Harris Unveils 160M Winnie

FORT LAUDERDALE,Fla. — A 160M-byte Winchester disk drive suited for compact packaged systems is available from Harris Corp.

The Model 5350 was designed for cabinet mounting in the packaged Harris Models 80 and 300 superminis, as well as in the peripheral cabinets for the Harris Models 100, 500 and 800.

The disk drive has four disks with five data surfaces. Average seek time is 30 msec and the I/O data rate is 1.2M byte/sec.

The drive costs $28,300 from the Harris Computer Systems Division at 2101 W. Cypress Creek Road, P.O. Box 6200, Fort Lauderdale, Fla. 33310.

# *Emulex SC750 Fits VAX-11/750*

SANTA ANA, Calif. — Emulex Corp. has announced the SC750, a disk controller designed for Digital Equipment Corp. VAX-11/750 processors.

The unit is said to be functionally identical to DEC's RH750 Massbus adapter combined with the DEC RM03, RM05 and RM08 disks. It is constructed on a single extended hex-size printed-circuit board, which mounts on any one of the three RH750 Massbus adapter slots.

The disk controller costs $8,950, the vendor said from 2001 E. Deere Ave., Santa Ana, Calif. 92705.

# Peripheral-to-Node Unit Fits Domain Machine

CHELMSFORD, Mass. — Apollo Computer, Inc. has introduced a peripheral adapter that is said to allow Multibus-compatible device connections to its Domain computer system.

The peripheral-to-node adapter (PNA) was designed to allow users to hardware-connect disk, tape and printer devices to Domain, a computer with architecture based on a local-area network of single-user workstations. Software drivers are included with peripherals supported by the firm, and a software driver development facility has been established to support peripherals supplied by other vendors, a spokesman said.

The PNA provides five slots within the Domain computational node for Multibus-compatible circuit cards. Apollo-supplied peripherals that connect to the PNA include a 300M-byte storage module disk (SMD)-compatible subsystem priced at $20,000, a slave disk drive priced at $18,000, a 1,600 bit/in. magnetic tape subsystem that costs $12,000 and 300- and 600 line/min printers priced at $7,500 and $10,000, respectively, the spokesman explained.

The PNA sells for about $3,000.

In addition to PNA-connected peripherals, users can support their own specialized devices using the firm's general-purpose I/O (GPIO) software package, he continued. With GPIO, users can reportedly write high-level language routines to control their own specialized peripherals, such as communications and data acquisition subsystems.

A single-user license for the GPIO costs $3,500, the spokesman said from the firm at 19 Alpha Road, Chelmsford, Mass. 01824.

# Aztek Offers Graphics Tools

LAGUNA HILLS, Calif. — Aztek, Inc. is offering graphics arts software and interactive color graphics CRT terminals, both separately and in a turnkey system.

The software is currently available for Hewlett-Packard Co., Digital Equipment Corp. and IBM CPUs. When the Slidegraph interactive graphics arts package is configured with one of the vendor's CRT terminals and a computer, it comprises a turnkey Slidesystem.

Slidesystem graphics output is offered on film or paper with a range of formats and resolutions.

A turnkey system includes an HP 1000 minicomputer, a 20M-byte hard disk drive, 256K bytes of memeory, a graphics image processor with up to 256 colors. Total turnkey prices start at $75,000, Aztek said from 23265 S. Pointe Drive, No. 100, Laguna Hills, Calif. 92653.

# Hi-G Announces Series 900 Printers

WINDSOR LOCKS, Conn. — Hi-G Co. has unveiled a line of serial dot matrix bidirectional printers that feature logic-seeking technology and an expandable character buffer.

The Series 900 printers are available in 80- or 132-col versions and print at 150 char./sec. The units print 96 Ascii printable characters and have a character buffer that can be expanded from 350 to 3,422 characters. The printers are Centronics Data Computer Corp.-compatible and can be used with RS-232C or current loop interfaces, a spokeswoman said.

Other features of the printers include a cartridge ribbon; condensed and double-density characters; and standard, alternate and down-loadable character sets.

Prices for the 80- and 132-col printers are $995 and $1,195, respectively from the firm at 580 Spring St., Windsor Locks, Conn. 06096.

typewriter. These cabinets are available on the B-300 and B-600, standard on the B-1000.

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### *For Insurance Company*

# Mini Halves Staff Handling Phone Calls

**American Home Shield's minicomputer, a Hewlett-Packard Co. 3000, took less than six months to implement, reported the user's MIS director, Robert J. Giles (standing, left), and Sigmund Anderson, vice-president for operations (standing, right).**

Special to CW

DUBLIN, Calif. — One of the biggest assets of American Home Shield's minicomputer-based system is that it cuts down the amount of time workers there have to deal with people.

While this may at first seem to be a contradiction in business terms, it is actually a boon to increased production. The less time the firm's personnel spend satisfying its home insurance clients, the more time it has to handle other cases.

Since installing the Hewlett-Packard Co. 3000 Series III computer system to manage its file system, the firm has reduced that amount of time spent on each call for service by 65%, cut personnel handling the calls by more than 50% and eliminated a lot of paperwork, according to Robert J. Giles, the company's director of management information systems.

### Average Load

American Home Shield is one of the world's largest home warranty companies, with more than 70,000 warranties in force in at least 43 states. The company deals with more than 20,000 participating real estate brokers nationwide and handles an average 16,000 customer calls per month.

Before implementing the system, each call took an average of seven minutes because the information concerning the customer's warranty had to be looked up by referring to written files. The company had a computer, but it operated sequentially. This meant that, if an agent wanted to retrieve information using anything but the warranty number, the files had to reviewed one by one, Giles noted.

Now, the HP 3000's keyed sequential access method (Ksam) and Image data base management system allow service agents to access a file using six different keys, ranging from the buyer's name to the street address and zip code.

American Home Shield's computer system consists of the 3000 Series III CPU with 1M-byte of internal memory, three 120M-byte disk drives, a 1,600 bit/in. tape drive and about 40 CRT terminals. The terminals and a 600 line/min printer are used to service seven of the firm's departments including service, dispatching, listing and closing, accounting, marketing, operations and systems programming.

Installing the system took Giles and three programmers less than six months. In all, more than 100 programs were written to handle the various service and marketing functions necessary in the firm's business.

The company uses the computer to handle data processing for its service calls and to generate work orders. It is also utilized for regular accounting functions such as accounts payable, invoicing and maintenance of the general ledger file.

### System Selection

The insurance firm selected the HP system on the basis of its uptime record, dependability and service record. However, the final choice was based on system cost.

Also, unlike other systems considered by Giles and his staff, the HP system was reportedly the only one that could fully support the firm's 16 Beehive International, Inc. terminals already installed as part of the outdated DP system. Another vendor came close, but "there was a potential for future service problems with a special electronic interface we would have needed," Giles pointed out.

The company saved about $24,000 by not scrapping the old terminals and linking them to the new HP 3000 system, he said.

Since the HP 3000 can conceivably accommodate substantial increases in the number of American Home Shield's warranties without a major change in hardware — and the firm is growing an average of 30% annually — it is seriously thinking of eventually moving into distributed processing.

According to Giles, the HP 3000 can handle a fivefold increase in work without any changes except the addition of more disk drives and memory. And a twentyfold increase could be realized if the firm decides to distribute the work load using HP's distributed processing network architecture.

## Business Systems With Winchesters Backed by Tape

ORANGE, Calif. — Systems Group, a division of Measurement Systems and Controls, has unveiled two series of disk-based small business computers that feature up to 40M bytes of Winchester storage and 20M bytes of unformatted tape cartridge backup.

The System 2832/2834 and 2842/2844 differ in their operating systems. The former uses the firm's Super CP/M, while the latter series has an enhanced MP/M or Oasis operating system for multiuser, multitasking operations, a spokesman said.

All four computers provide a combination of streaming or file-by-file backup and have a tape data transfer rate of 30K byte/sec and a tape speed of 30 in./sec.. The recording cartridges feature four recording tracks with a recording density of about 8K bit/in.

The System 2832 and 2834 are priced at $11,400 and $13,160, respectively. The 2842 lists for $12,200 and the 2844 sells for $13,960.

Additional information on the systems can be obtained from Systems Group, 1601 Orangewood Ave., Orange, Calif. 92668.

## Hand-Held CPUs Tied to HP Units

CORVALLIS, Ore. — Hewlett-Packard Co. has introduced an interface that enables the firm's hand-held computers to control and read data and interact with HP tape cassette drives, printer/plotters and instruments.

The HP interface loop (HP-IL) uses a two-wire cable in a closed loop that connects all devices in a series. Commands and data move around the loop in one direction at rates up to 5K byte/sec.

The interface acts as a master/slave device, meaning that commands are received and retransmitted by every device, but are acted on only by the device specified by the controller, a spokesman said.

The HP-IL interface module costs about $125 and will be available sometime in February 1982 from the firm at 3000 Hanover St., Palo Alto, Calif. 94304.

## Z80-Based Micro Offers 64K RAM

GARDEN GROVE, Calif. — Advanced Micro Digital Corp. has announced a Z80-based, S-100 board microprocessor called Super/Net.

The board consists of 64K bytes of random-access memory, a Z80A microprocessor, 2K bytes of erasable, programmable read-only memory, a 5¼- and 8-in. floppy disk controller and two serial and two parallel interface ports, the vendor said.

The board costs $1,125, the vendor said from Suite E, 7201 Garden Grove Blvd., Garden Grove, Calif. 92641.

# Mini Bits

## ALS Announces Apple Subsystem

SUNNYVALE, Calif. — ALS, Inc. has announced the Synergizer, a CP/M-based subsystem for Apple Computers, Inc. processors.

The subsystem includes Smarterm, an 80-col display board; Z-Card, an ALS Z80 microprocessor that provides CP/M capabilities for both Apple II and Apple III processors; and Add-Ram, a 16K-byte random-access memory board that permits full memory addressing from the Z80A microprocessor, the vendor said.

The subsystem costs $749, the vendor said from 1195 E. Arques Ave., Sunnyvale, Calif. 94086.

## Direct Access Memory Unveiled by Wesper

TUSTIN, Calif. — Directly accessible add-on memory for Apple Computer, Inc. Apple II and Apple II Plus computers now is available via a 16K-byte random-access memory card from Wesper Microsystems, Inc.

The Wizard-16K card reportedly is used with 48K-byte Apple II computers and adds 16K bytes of memory, which translates into 56K bytes of total usable memory.

The price of the Wizard-16K is $169 at retail computer stores, the vendor said from 14321 New Myford Road, Tustin, Calif. 92680.

## TII Power Protector Available in 3 Stages

COPIAGUE, N.Y. — The Electronics Division of TII, Inc. has announced a three-stage power protector, the Glitch Guard.

The unit can be used for any small business processor, home computer or word processor. It is rated at 120 Vac and 15A. It is a single-phase unit and plugs directly into a wall socket.

The device costs $89.95, the vendor said from 1375 Akron St., Copiague, N.Y. 11726.

## HP Cuts Back Price On HP 85 by 15%

PALO ALTO, Calif. — Hewlett-Packard Co. has cut the price on its HP 85 personal computer by 15%.

The unit now costs $2,750. It used to cost $3,250, the vendor said.

In addition, HP also cut the price of its 82903A 16K-byte memory module for the HP 85. That unit now costs $195. It used to cost $295, the vendor said.

HP is based at 3000 Hanover St., Palo Alto, Calif. 94304.

## Smoke Signal Offers Tape Streamer

WESTLAKE VILLAGE, Calif. — Smoke Signal Broadcasting has introduced a tape streamer backup option for its Chieftan and Pathfinder series of microcomputer-based business computers.

The tape streamer backs up the firm's Winchester-based disk systems and can store up to 20M bytes on a standard cartridge, a spokeswoman said. The drive operates at 90 in./sec and can reportedly store 20M bytes of data in less than five minutes.

The tape option is available for an additional $1,500 tacked on to the list prices of the firm's computer systems. Smoke Signal is located at 31336 Via Colinas, Westlake Village, Calif. 91361.

## FBS Announces Model 2000 Encoder

RANDOLPH, Mass. — Farrington Business Systems, Inc. has announced the Model 2000 Encoder, which encodes and decodes magnetic stripes on plastic cards.

The unit can operate on three tracks and includes an alphanumeric keyboard, two I/O ports and operator-select keys as standard features, the vendor said.

Units start from $7,500, the vendor said from the Randolph Industrial Park, Randolph, Mass. 02368.

## Correction

In a recent product announcement detailing Diablo Systems, Inc.'s Model 630 keyboard send-receive printer [CW, Dec. 7], the vendor incorrectly quoted the price at $2,795. The correct price of the printer is $3,325.

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# Message System For Univac 1100 Gets Additions

ANAHEIM, Calif. — Formula Consultants, Inc. has released an enhanced version of its Message Management System (MMS-1100), which offers Univac 1100 users electronic mail services and remote report printing.

Level 2Rl of MMS-1100 executes on any Univac 1100 computer system using the standard OS-1100 operating system. The package functions as a transaction interface package application utilizing any network supported by the standard communications management system.

MMS-1100 provides computerized transmission and distribution of administrative messages. The service includes broadcast capabilities, multiple delivery priorities and inbox/outbox status information.

It also provides a report printing function that allows remote locations to receive short reports on terminal printers, instead of more expensive remote job entry devices.

The user can review the status of outgoing or incoming messages and can request a list of outgoing messages or delivery status for a particular message, the vendor said.

Various configurations of MMS-1100 can be licensed for $15,000 to $25,000, according to the vendor, which can be reached through P.O. Box 544, Anaheim, Calif. 98205.

# Turnkey Offers WP, Finance

BURLINGAME, Calif. — A turnkey word processing/financial accounting computer priced at $4,995 is available from Transnational Computer Corp.

A single financial data entry to the Eagle II is automatically error-checked and input to the appropriate accounts: general ledger, accounts receivable/payable, inventory control, payroll, sales or purchase order and point-of-sale, according to the vendor.

The CP/M-compatible computer has both a standard typewriter keyboard and numeric keypad. The turnkey system may be expanded to 10M bytes, a spokesman said from 1545 Old Bayshore Highway, Burlingame, Calif. 94010.

# WP Systems Tied To Typesetters

HILLSBORO, Ore. — An interface that provides a link between most computers or word processing systems and the AM International Comp/Set or Comp/Edit series of phototypesetters is available from Information Design.

The Series 1000 Interface uses the RS-232C protocol and features data buffering, switch-selectable bit/sec rates from 110 bit/sec to 9,600 bit/sec and a Bell 103A modem compatible for remote or dial-up operation.

The interface may also write AM International-compatible flexible diskettes through the optional record/playback module on the phototypesetter. In this mode, a job can be downloaded from the host to a diskette and later edited and typeset without intervention from the host system, the vendor said.

The interface costs $1,495 from Information Design, P.O. Box 68, Hillsboro, Ore. 97123.

# Some User Sites Have Managed — In a Patchwork Fashion — Integration of DP, WP Functions

By Dean L. Hiller

Special to CW

System designers have long foreseen the need to provide some type of integration between word and data processing. In fact, a degree of integration now exists between these functions in a number of computer installations across the country.

Unfortunately, however, this integration has often been characterized by a patchwork approach.

For example, to allow the generation of form letters, an interface is usually programmed to pass name and address information from computer vendor and customer files to word processing. A much more logical and efficient way to allow this type of data manipulation would be to build the necessary capability into the original word processing software.

The typical computer installation has several accounting or administrative systems, word processing and some form of records management and report generation. There might also be a prospect data base on the user's records management system and vendor and customer files in the payables and receivables systems.

### Generating Form Letters

The user's primary objective in integrating DP and word processing is to access name and address information easily from data processing files in order to generate form letters. When the word processor is able to place fixed information from these files into the user's document automatically, the user's needs will be met.

Word and data processing integration demands that any data retrievable by the word processing operator should be available through the use of the word processing software. Note the focus on the operator of the word processor. This is where the control and usage belongs.

An end product of word processing is usually one of three types: form letters, reusable text letters (proposals, specifications and so forth) or one-time demand items (such as correspondence). Only the first type is usually related to DP.

User select functions to retrieve data from the DP system and place it in conjunction with word processing text must be available in a successful integration effort. These functions should be available from, and through, the word processing system.

By making additional data retrieval and formatting available through the word processing software, the user will be able to create documents from his data processing files.

### Logical Design

With this kind of user specification, what will the design of word and data processing systems look like in the future? Obviously, the word processing command set will have to be altered. It will require special characters and syntax to allow retrieval of data from various DP systems. It should also have additional text areas to allow such data, after retrieval, to be reviewed properly and verified visually.

Let us take a look at the logical functions of word processing software and records management and report-generation software. Note the logical functions within records and reporting software: data storage, data update, report formatting and build up and data dictionary control. In the word processing software, the basic word processor consists of a text processor (or manipulator), screen output and keyboard input and text storage control.

Basic data storage files include keyed files, sequential files, data base management system files and often some type of data dictionary support for combinations of all these files. The final item, text files, is a type of sequential file. With this visual layout, it is easy to see the DP functions that can be shared by the word processing system.

### Additional Functions

The necessary additional functions, data storage and maintenance of the data dictionary, are derived from the records and reporting software.

By adding these functions to word processing software, the technology of records management and report generation are merged with that of text management. This merging would necessitate the expansion of the current word processing command set to allow almost total access to DP information.

A possible format for this expansion of command set would include a special character to indicate a data retrieval function, a file descriptor (for example, and a data descriptor (for example, file = vendor key = "ABC Co.," data descriptor = address). This is the normal syntax of a data dictionary. The use of a data dictionary then becomes one of the tools in the word processor's command set.

Why have we not seen this type of product on the market as yet? Few, if any, software designers appear to be developing such an integrated product. The specialization of software firms in single products is probably to blame. Those firms that first realize the required commonality of function between the word processing and data processing applications will be the first to benefit from the potential market for such products.

*Hiller is a senior consultant in the Management Advisory Services Department of the Detroit office of Alexander Grant & Co.*

# WP Software Ready for Users Of Basic Four

ALBEQUERQUE, N.M. — The AOS Division of RCO Corp. has unveiled a word processing software package for Basic/Four Corp. computers.

The software provides a combination of DP and word processing capabilities that allows most record keeping, reporting, text processing, document preparation and other office automation functions to be accomplished without custom software or a technical support staff, according to the vendor.

The software operates on a single terminal System 200 or 210, or a 32 terminal System 730, among others, the vendor spokesman said.

The word processing software package costs $2,500, as does a records management package, AOS said. The vendor can be reached through P.O. Box 26027, 4801 Indian School Road, Albequerque, N.M. 87125.

### And Calculator Mode

# Magna III Gets Communications

CHICAGO — A.B. Dick Co. has added communications and calculator-mode enhancements to its Magna III information processing system software.

Magna III to Magna III communications allows document transmission between remotely located Magna III word processors while preserving text format integrity, the vendor said.

This feature is a "background" function and will allow operators at both sending and receiving stations to continue with other tasks while communications are in progress. The two transmission speeds are 300 bit/sec or 1,200 bit/sec, according to the vendor.

The Magna III Calculator Mode allows four-function numeric calculations and percentages to be performed. Calculations can be done in this mode while the numbers are being typed or after the statistical work has been completed, according to the vendor.

The basic Magna III workstation costs $7,500. All operating software is standard, A.B. Dick said from 5700 W. Touhy Ave., Chicago, Ill. 60648.

# System Manages Office Supplies Inventory

NEW YORK — A software system designed to control and manage the inventory of general office supplies such as a variety of forms, sales brochures, binders, typeset papers and photocopy paper is available from Yipkon Corp.

The Office Supplies Inventory Management System runs on the Wang Laboratories, Inc. VS computer. It automates the cycle of requisition processing, billing pick-list generation, back-order processing and acts as a direct interface with the internal expense accounting system for appropriate internal cost charge-back.

Both single and multiple warehouse versions of the system are available with the additional option to interface with a purchase order system. The software costs approximately $35,000 from Yipkon Corp. at One World Trade Center, Suite 7967, New York, N.Y. 10048.

# 'Zipmaster' Introduced

INDIANAPOLIS — Zipmaster Corp. has unveiled a computerized addressing system that comes as part of a desktop computer.

The Zipmaster features security access, duplication check, count feature, multiple workstations offering multiple access to common files, Zip Code breaks and unlimited selection capabilities and optional word processing and telecommunications.

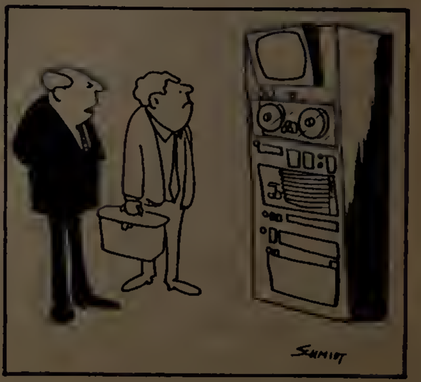
The price of the Zipmaster starts at $13,000. Image Graphics can be reached through P.O. Box 55148 Indianapolis, Ind. 46220.

# Olivetti Cuts DY 811 Price

TARRYTOWN, N.Y. — Olivetti OPE has cut the price of its high-end daisywheel printer, the DY 811/ASF, from $3,990 to $3,470, without the automated paper insertion capabilities.

The DY 811 series is a geared to a larger data and word processing environment and features a 17-in. removable platen, four printing pitches, a 1K-byte buffer, an eight-bit Centronics Data Computer Corp., RS-232C or industry-standard 50-wire interfaces and ribbon cartridges.

More information is available from Olivetti OPE, 505 White Plains Road, Tarrytown, N.Y. 10591.



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# *Mercurial U.S. Export Policy; Industry Officials Worried About Effect on Trade Partners*

**By Jake Kirchner**
CW Washington Bureau

WASHINGTON, D.C. — While the American electronics industry has reconciled itself to losing sales to the Soviet Union [CW, Jan. 11], industry officials are concerned that constantly changing U.S. export policies will harm U.S. relations with other, more important trading partners.

Thomas Christiansen, manager of international trade relations for Hewlett-Packard Co., warned just prior to President Reagan's suspension of high-technology export licenses to the Soviet Union that such action would hurt the U.S. more than the Soviet Union.

Unless the U.S. can develop with its allies a unified approach to trade restrictions, sanctions are not effective, he told the Trade Subcommittee of the House of Representatives Ways and Means Committee last month.

"Unilateral controls should be employed very sparingly and only where it can be reasonably determined such controls will have a direct measurable effect on the target countries," Christiansen said in a statement prepared on behalf of the American Electronics Association and the Scientific Apparatus Makers Association.

### Symbolic Controls

The Soviet Union will only turn to other Western countries for its high-technology needs, making U.S. export controls useful only for symbolic purposes and making it difficult for American companies to resume normal trading relations with the Communist bloc once the controls are lifted, he noted. But such controls are even more harmful in their effect on U.S. trade with other countries, Christiansen said.

"There is ample evidence that the effect of unilateral controls extends far beyond the specific situations they are supposed to influence," Christiansen said, citing several side effects of unilateral restrictions:

- Purchasers of U.S. products in friendly countries "have become increasingly concerned at what they perceive to be the never-ending vagaries of U.S. controls — South Africa, Rhodesia, Uganda, human rights, nuclear proliferation, Iran [and so forth]." As a result, he said, "many are seriously considering reducing their dependence on U.S. suppliers."

- There is increased work for U.S. suppliers seeking export licenses to all countries and for U.S. licensing officials handling the requests. This cuts the efficiency of the system in general, Christiansen said, which tends "to divert more business to our competitors abroad, who, not facing similar licensing requirements, can accept orders unequivocally and ship as soon as the material is ready.

- "Once imposed, controls seem to enjoy a life of their own and are very difficult to terminate. This means," according to Christiansen, "U.S. business is likely to bear the burden of increased paperwork delays and loss of business long after conditions have changed and the reason for instituting controls has gone."

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# STC Chairman Offers His Tactic for Success: 'Stick Your Neck Out'

**By Marcia Blumenthal**
CW Staff

LOUISVILLE, Colo.— "In this business, unless you stick your neck out, you won't get anyplace," asserted the chairman and president of Storage Technology Corp. (STC).

A calculated approach to risk taking is the key element in the formula that has propelled STC to the rarefied threshold of the billion dollar annual revenue mark. The peripherals maker, whose volume of disk and tape products is second only to IBM, will reach the billion dollar pinnacle this year — one of the few firms in the computer industry to scale that summit.

A good part of the company's dynamism comes from Jesse I. Aweida, STC's chairman and president. An intense and charismatic figure who undeniably runs the show at STC, Aweida has apparently captured the admiration and loyalty of STC employees. Industry analysts consider him savvy in both marketing and financial matters and a harder-than-nails negotiator.

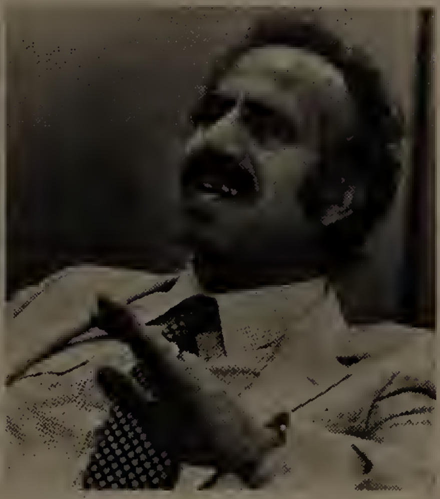
Aweida's secret? "I like to keep the excitement going. I challenge people by knowing what the market needs. I'm tuned to the market," he said during a recent interview here.

### No Bones

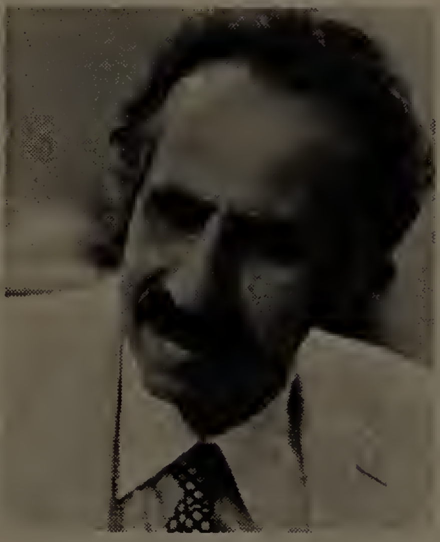
STC has stirred up plenty of excitement in the past two years. Aweida has made no bones about his plans to make the firm the first full-line IBM plug-compatible system supplier.

In pursuit of that goal, STC in 1980 lost out on merging with Amdahl Corp. after a well publicized beef with Japanese computer giant Fujitsu Ltd. devel-

*(Continued on Page 76)*



**'I like to keep the excitement going. . .**



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# DEC Forms Systems Group

MAYNARD, Mass. — Digital Equipment Corp. has formed a market organization called the Small Systems Group.

Market and product organizations folded into this group include commercial OEM, terminals, word processing and retail and small systems, according to a DEC spokesman.

The move is designed to strengthen DEC's presence in and broaden its penetration of the low-end market, the firm said.

Heading the group as vice-president-group manager is Andrew C. Knowles III. Knowles has been heavily involved with the small computer marketplace since he joined the company 12 years ago.

# Supershorts

Telecommunications administrations in the UK and Canada have launched electronic message services in their countries under a licensing agreement with GTE Telenet Communications Corp.

— — —

CMS Industries, Inc. will now be known as CMS/Online. The company is part of the Business Services Division of Computer Sciences Corp.

— — —

Apollo Computer, Inc. installed its 100th Domain processing node at Bendix Advanced Technology Center in Columbia, Md., recently.

— — —

A joint venture has been announced between California Devices, Inc. (CDI) and Giltspur Microsystems, an English company, to establish a design center in the UK for CDI's silicon gate arrays.

— — —

Universal Data Systems, Inc. has been selected as the major modem supplier for the Federal Aviation Administration's new Flight Service Automation Systems, according to the vendor.

— — —

MSI Data Corp. has concluded an agreement with two major Japanese companies under which MSI will market worldwide a new hand-held data entry terminal. The two firms are Matsushita Communication Industrial Ltd. and C. Itoh Electronics, Inc.

— — —

The Tektronics Foundation and Tektronix, Inc. have made a $207,500 commitment in support of the computer-aided design and manufacturing program at Lehigh University. The grant provides funds for laboratory renovations, graduate student support, equipment and its industrial program.

— — —

Gandalf Data, Inc. has received a $154,686 grant from Illinois to train 80 new employees.

— — —

Honeywell, Inc. recently received a Presidential citation at the White House for the company's Massachusetts training program, whereby company employees volunteer to train prison inmates in computer techniques.

# SIA Establishes Research Plan For Chips

PALO ALTO, Calif. — The Semiconductor Industry Association (SIA) has established a program that will focus on long-term semiconductor research and stimulate joint study efforts by both manufacturers and universities.

The Semiconductor Research Cooperative (SRC) will seek to further expand investigation into such computer areas as very large-scale integration semiconductor designs, packaging and testing and other related technologies, Robert W. Noyce, SIA chairman and vice-chairman of Intel Corp., a leading chip manufacturer, said.

Erich Bloch, IBM vice-president of technical personnel development, has been named chairman of the interim board of directors of the SRC.

### Still in Infancy

"Despite its growth, the semiconductor industry still is in its early stages," Noyce said at the program's launching last month. "New developments are coming at a rapid rate and leadership in semiconductor research will determine market performance in the future."

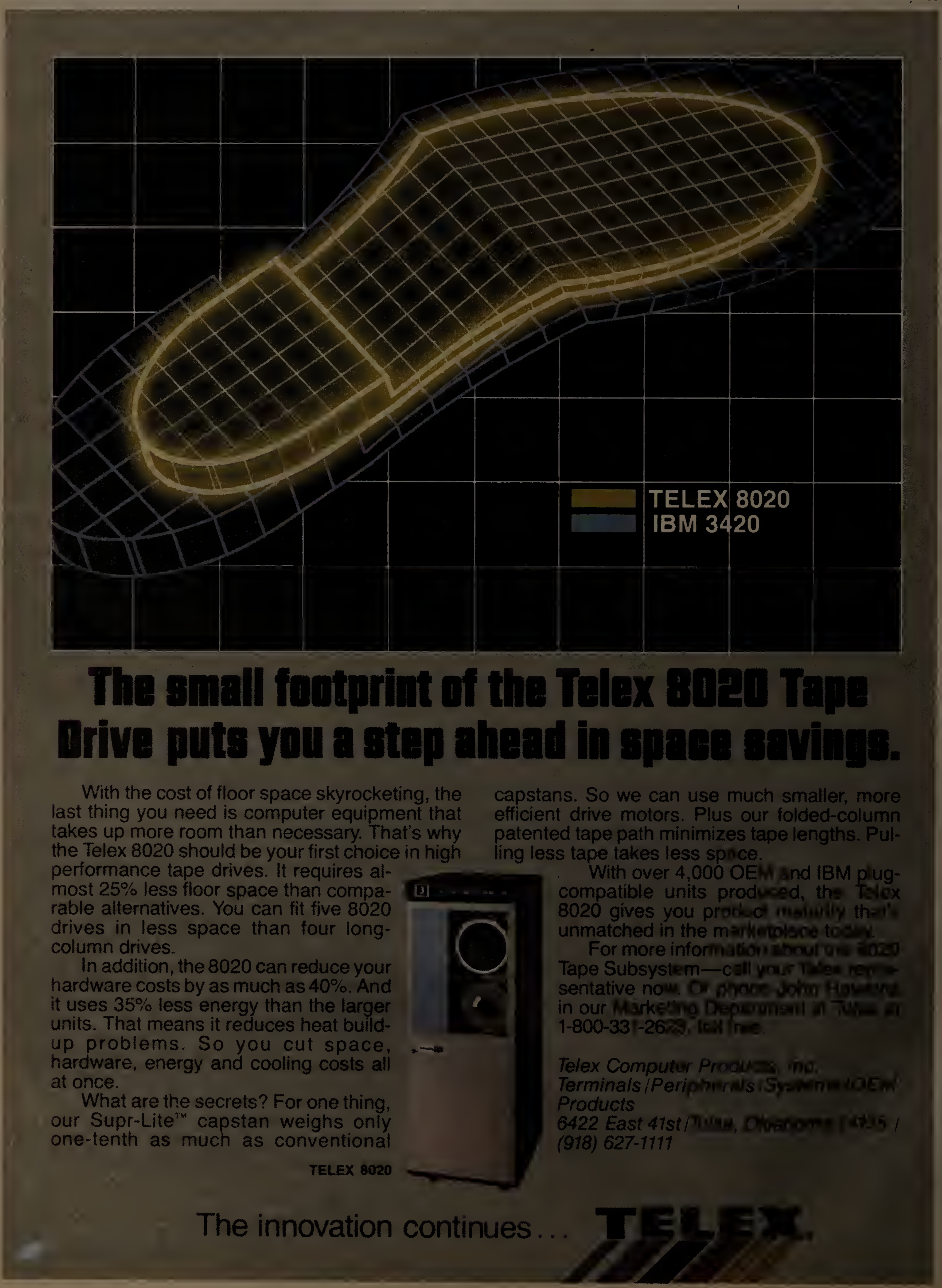
Noyce explained that, for some reason semiconductor research efforts in the U.S. — in terms of real dollars spent — has been decreasing in the last few years. But by joining forces from both the vendor and academic communities, the SRC should reverse this trend, he said.

Possible areas where joint research might benefit include such generic-related fields as: electron beam and X-ray technology, new semiconductor processes, materials science and computer-aided design techniques.

The SRC will be composed of U.S.-based semiconductor manufacturers and both merchant and user firms. Foreign manufacturers are also invited to participate, provided that their home nations allow similar access to technological efforts, Noyce said.

Funding, equipment and technical personnel for the NRC effort will be provided by program members to universities and research centers pursuing study projects.

Research projects will be targeted for a minimum of three years in the future, he added.



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The innovation continues...

# HP Earnings Rise 16%, Revenues 15% in 1981

**By Robert Batt**
CW West Coast Bureau

SAN FRANCISCO — Hewlett-Packard Company has reported a 15% increase in revenues and a 16% increase in net earnings for the year ended Oct. 31, based on unaudited results.

Revenues totaled $3.8 billion, compared with $3.1 billion in the previous fiscal year, while net earnings amounted to $312 million or $2.55 per share, compared with $269 million and $2.23 per share in fiscal 1980.

Although fourth-quarter sales totaled $1 billion for the first time in the company's history, HP President John A. Young described the results as "below our expectations."

"We fell short of our objectives in both sales and incoming orders for the quarter. This shortfall, coupled with unusually high expenses in the quarter associated with new product development, affected profit margins more than anticipated," he said.

Speaking to the annual meeting of security analysts here, Young said incoming orders for the year totaled $3.71 billion, up 18% from the previous year.

### International Growth Slow

Although domestic orders continued to show an upward trend, international orders when converted to dollars continued to show a low rate of growth, particularly in Europe, Young said. This was due to the appreciation of the dollar and an unfavorable economic climate in many countries.

"Continued uncertainty in the U.S. economy can be expected into 1982, but various tax incentives related to investment and [research and development] R&D should have a positive influence on company profits as well as stimulate orders from many U.S. customers during the coming year," he added.

Although conditions in Europe are also uncertain, Young said that he expects to see gradually improving conditions in Europe in late 1982.

Domestic orders accounted for 52% of all orders during the year and totaled $1.92 billion. This compares with 48% and $1.52 billion in fiscal 1980. International orders were $1.79 billion for the year, compared with $1.62 billion last year.

Preliminary figures show that for the last financial year the company's electronic data products represented approximately 49% of total sales. The other major HP product group is in the area of instrumentation.

# *Former OPM Execs Plead Guilty*

NEW YORK — Five former vice-presidents of OPM Leasing Services, Inc. pleaded guilty late last month to defrauding lending institutions of $190 million.

The five men confessed they induced 19 banks, insurance companies and other lenders to buy more than 60 notes secured by falsified leases that supposedly existed between OPM and Rockwell International Corp.

OPM principals Myron S. Goodman and Mordecai Weissman were named co-schemers, but were not defendants in the fraud charges. These charges stated that the five men acted "under the direction and supervision of" Goodman and Weissman and "other co-schemers."

The U.S. Attorney's office here said the investigation was continuing and that other fraud charges will probably be filed at a later date. It is unknown whether Goodman and Weissman will be charged.

The five men who pleaded guilty were Allen Ganz, Stephen M. Lichtman, Martin Shulman, Jeffrey Resnick and Mannes Friedman.

OPM filed for protection under the federal bankruptcy laws last March shortly after the fraud investigation came to light. Recently the trustee in bankruptcy for OPM said there was no doubt OPM had perpetrated "massive fraud."

It is estimated that some 50 banks and financial institutions and well over 100 users stand to lose a quarter of a billion dollars or more [CW, Nov. 23].

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# Executive Corner

## Conrades, Lucente Named IBM VPs

ARMONK, N.Y. — IBM has appointed George H. Conrades and Edward E. Lucente vice-presidents of the corporation.

Conrades is the president of IBM's new National Accounts Division.

Lucente, formerly IBM director of business plans, has been named president of the Information Products Division. He succeeds IBM Vice-President Robert B. Dunlop, who was recently named to direct a special project involving IBM world trade manufacturing.

In other moves, IBM Vice-President Arthur G. Anderson became president of the General Products Division. That division's responsibilities have been expanded to include worldwide guidance on manufacturing, as well as development of IBM's storage products.

Succeeding Anderson, IBM Vice-President Jack D. Kuehler took over as group executive of the Information Systems and Technology Group. Dr. Edward M. Davis was named president of the General Technology Division, succeeding Kuehler.

William W. Eggleston, formerly president of the General Products Division, was named assistant group executive for strategic programs of the Information Systems and Technology Group.

Richard T. Gerstner was appointed IBM director of business plans. He was formerly vice-president of business plans for IBM Europe.

## Other Moves

- Hans P. Ikier has been appointed chief executive officer of Ikier Technology, Inc. T. Colin Barton has been named senior vice-president for market and product development at the same company.
- Dr. Edward M. Davis has been named president of IBM's General Technology Division.
- Roger Jones has been appointed vice-president of the Southwestern Group for Kierulff Electronics, Inc.
- Barry Fidelman was elected vice-president of marketing and customer services at Apollo Computer, Inc.
- Sheldon Rutstein has been elected vice-president/controller for Raytheon Co.
- M. Tracey Zellman has been named director of advanced manufacturing, engineering and technology, a new position at Data General Corp., and Peter Mork has been promoted to director of Japanese business development at that company.
- Cray Research, Inc. has promoted Lester T. Davis and Peter L. Appleton Jones to executive vice-president posts.
- Mike Stangeby has been appointed director of a new division of Satellite Syndicated Systems, Inc. (SSS), which will develop the four satellite cable networks previously announced by SSS.
- D. Michael Cannady has joined CTS Services, Inc. as vice-president of marketing.
- James Himler has been promoted to treasurer for the Sorbus Service Division of Management Assistance, Inc.
- Phillip Krumb has joined ITT Courier Terminal Systems, Inc. as vice-president of finance.
- Glen Cavanaugh has been named vice-president and manager of interactive systems at Evans & Sutherland Computer Corp.
- Adam J. Bardach has been appointed general manager of Systcoms, Inc.'s Memotec Division.
- George Reyes has become the new vice-president of finance and administration and chief financial officer at On Line Microcenters, Inc.
- Robert Anundson has joined Interactive Technology, Inc. as vice-president of sales and marketing.
- T. A. Dolotta has joined Interactive Systems Corp. as vice-president of technical operations.
- A.I.M. Computer Systems has appointed Nick Catanese vice-president.
- Kent Friel has been promoted to executive vice-president and general manager of Access Corp.
- Dr. Gene Starr has joined the staff of Compuscan, Inc. as vice-president of corporate development.

## Expansions

**Tymnet, Inc.** has moved into its new 79,000 sq-ft building at 2710 Orchard Parkway, in Orchard Technology Park, San Jose, Calif. 95134.

**Information Displays, Inc.** has opened a sales office located near O'Hare Airport at Suite 106, 109 Fairfield Way, Bloomingdale, Ill. 60103.

**Otrona Corp.** will be relocating to larger facilities to accommodate its increased manufacturing requirements. The new address will be 4755 Walnut St., Boulder, Colo. 80301.

**California Computer Products, Inc.** began the first phase of a five-year expansion plan when it broke ground on a $13-million manufacturing and engineering building at the company's headquarters at 2411 W. La Palma Ave., Anaheim, Calif. 92801.

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# Risk-Taking Stance Seen Key to STC Success

(Continued from Page 71)

oped. "When the deal with Amdahl didn't go through, we looked around but no one else had the high-powered MVS-type system [we wanted], and we couldn't do the development [inside the company]. So we had to go with a research and development partnership," Aweida explained.

A public offering raised $50 million for STC Computer Research Corp., the first R&D partnership formed in the industry.

Expected out during the first quarter of 1984, STC's first IBM-compatible processor will incorporate Cmos technology and be an entry-level unit in the range of four million instructions per second (Mips) to seven Mips. Cmos is a high-density, low-power technology, but has traditionally had a slow processing speed. Recent developments at STC and other places, however, have allowed engineers to speed up the processing performance.

Although products from STC Research Corp. are aimed at the high end, STC has recently gained an opportunity to move into the low- to medium-range processor market with its offer to acquire Magnuson Computer Systems, Inc. through a stock transfer. Magnuson, a plug-compatible mainframemaker that was considered a potential high flyer when it went public in 1980, has fallen on financial hard times and lost many key personnel.

Adding to its processor arsenal, STC acquired printer manufacturer Documation, Inc. at the end of 1980.

Besides processors and printers, STC has an active communications subsidiary that makes the COM2 concentrator/multiplexer. This business is, as Aweida put it, "18 times behind what we wanted it to be, but we have two more products planned for that market." Last year the communications unit did about $25 million in volume.

### Primary Business

Despite the current race to become a full systems supplier, STC's primary business for the foreseeable future will continue to be peripherals. "Until 1987 about 75% of our volume will still be in peripherals," Aweida cautioned.

Until recently STC has taken a fairly narrow perspective on its business. Aweida sees the CPU business as a natural extension of the way STC has approached its business.

The plan was to pick one area [tape] and do it well — build a manufacturing base and a marketing and service base geared to end users, he stressed. "And then we added another product. We had to restrain ourselves from doing too much. One of the things people in our business fall for is doing too much. If they do well in one year the next thing you know they want to do everything," he continued.

Even though STC is rapidly expanding its OEM peripherals business, those products are derivatives of standard STC products adapted for the OEM market.

### Major Criticism

Although some Wall Street analysts are "doubting Thomases" about whether Aweida can profitably pull off the transition to full systems suppplier, other analysts and former employees think otherwise.

The major recent criticism Wall Street pundits have made is that STC's disk business has not been as profitable as the firm's mainstay tape business. They further contend that the unusually high demand STC had for disk products last year was a result of IBM's inability to produce disk products in high enough quantities, a situation that is bound to improve this year.

Aweida considers all that just so much hogwash. "Right now profits from our disk business are equal to our tape business. In 1979, profits from disk weren't that good, in 1980 they were better and 1981 was good," he said, adding that he thinks demand for disk from STC will continue to be high.

Those who think STC can make the transition from peripheral to system supplier cite the firm's ability to quickly change directions and innovate. Moreover, Aweida has been savvy enough to reorient the company from an entrepreneurial wonder to a tough company tuned to the realities of a grueling marketplace.

STC is bringing in a lot of middle management from the IBM fold, one former employee noted.

### Hard Work

Nonetheless, Aweida works hard at keeping STC from becoming too bureaucratically cumbersome. "This is a very democratic place. I can be told anytime by anyone that my idea stinks. They [the employees] know they can do that — provided they have a better idea," Aweida quipped.

Moreover, the company's ability to increase profits at an average annual rate of 61% and revenues at 51% since 1976 has been credited to the firm's capability of adapting to quickly changing market conditions.

"If you don't demand a product review every six months, you may be wasting money. So instead of spending R&D money for three months you may be spending it for 15 months," Aweida explained. A recent case in point was the firm's 2700 OEM disk product. It was a good product, Aweida said, but it couldn't be built cheaply enough. "So when we say we are spending $100 million on R&D, it's all good bucks."

Two new areas STC is excited about are its Virtual Storage System, a back-end processor introduced last year, and an optical disk system. The former was the firm's first "systems product" with a heavy software content.

In addition, Aweida has recently been hopscotching the globe on the bandwagon for STC's optical disk R&D partnership. The venture currently employs 115 people. The first optical disk product will be shipped at the end of 1983.

Optical disk is an extension of STC's other storage products. It is a nonerasable medium that can store 4G bytes on one platter for applications where it is desirable to keep input and output data in the same place — a master file.

STC is driven in its effort to keep product costs down and to innovate. The double density 3350-type disk (STC's 8650) and its 4305 semiconductor disk are two examples of innovative products that are not available from IBM.

"We hate to lose; we are always looking over our shoulders,"Aweida said, summing up his firm's philosophy.

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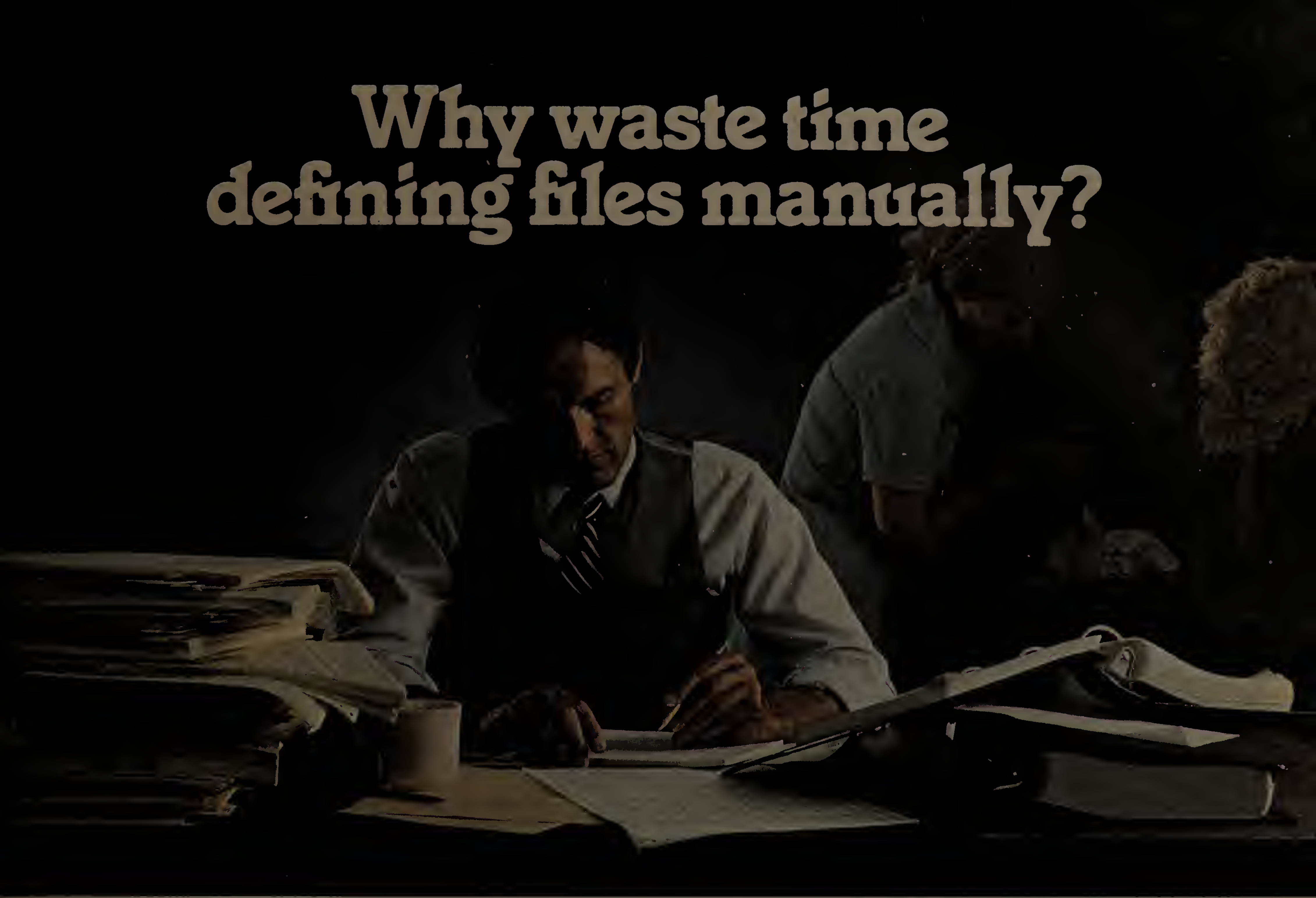

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## New Companies

**Reiter Software Systems, Inc.**, a U.S. subsidiary of the Haifa-based company Reiter Software Systems, Ltd., has been formed to market and support Reiter's software products. The firm specializes in advanced systems software for the IBM Series/1 and is located at 211 Sutter St., San Francisco, Calif. 94108.

**Sterling Software, Inc.** has been formed to serve as a holding company for a series of investments planned for small- to medium-size software companies. The company is based at 1001 Campbell Centre, 8350 N. Central Expressway, Dallas, Texas 75206.

**American Sun Moon Star**, the American representative of the Taiwan-based Sun Moon Star Group of companies, has been formed to market the firm's line of electronic systems and components and to contract for subassembly, assembly and manufacturing activities to be performed by the Taiwanese firm. It is headquartered at 655 W. Evelyn Ave., Mountain View, Calif. 94041.

**Quantum Research** has been formed to develop and market a software package for the entertainment industry. The company specializes in providing turnkey software systems and assistance to support entertainment organizations and is based at 28200 Ridgefern Court, Rancho Palos Verdes, Calif. 90274.

## Nickels & Dimes

**Dataflex Corp.** has begun stock trading in the over-the-counter market.

$ $ $

**Shared Medical Systems Corp.** will increase its quarterly dividend to 12 cents per share, payable Jan. 15 to shareholders of record Dec. 31, 1981.

$ $ $

**Wespercorp** has privately placed an aggregate of $3 million worth of its 12%-convertible subordinated debentures to a group of institutional investors led by T.A. Associates of Boston.

$ $ $

The American Stock Exchange began trading in the common shares of **Dataram Corp.** on Dec. 16.

$ $ $

**Ikier Technology, Inc.**, a newly formed computer graphics manufacturer in Burlington, Mass., has announced the successful completion of first round financing.

$ $ $

**Plexus Computers, Inc.** has completed its second round of financing, a $6.1 million package.

$ $ $

The Board of Directors at **Raytheon Co.** has voted to raise the quarterly dividend to 35 cents per share from 30 cents. The dividend is payable Jan. 26 to stockholders of record Jan. 8.

$ $ $

**Informatics, Inc.** has signed a revolving credit and term loan agreement with two banks for $12 million.

$ $ $

**Avera Corp.** has attracted $2 million in additional financing and has elected Pierre R. Lamond to its board of directors.

## Orders & Installations

**Datacrown Inc. has signed a seven-year contract with Crown Life Insurance Co., Ltd. of Toronto, estimated to be worth $53 million, for complete computer services to Crown throughout its North American operations.**

Control Data Corp. and Merchants National Bank & Trust Co. of Indianapolis have signed an agreement that will make CDC's DP services available to customers now served by the bank.

**Recent orders at Sperry Univac include two requests for the $5 million Univac 1100/82 multiprocessor — from the University of Maryland and Tomlinson Geophysical, Inc. of Houston — and one order for the $700,000 Univac 1100/60 system from King Bearing, Inc., a Stockton, Calif.-based distributor of farming equipment.**

Orders at Electronic Data Systems Corp. (EDS) include one from the Nevada National Bank of Reno, for direct on-site management of the bank's DP functions, and another from HCA, Inc., a Denver life insurance holding company, for EDS' Life Management I.

**The Treasury Department has installed a computer graphics software system from Integrated Software Systems Corp.**

St. John's University in New York City has recently installed a Honeywell, Inc. Multics computer system to be used for instructional and research purposes. The Level 68 DPS computer is valued at $2.3 million.

**Northern Telecom InternationalLtd. and the Bermuda Telephone Co. Ltd. have signed a $9 million contract to modernize the telecommunications network of the resort island, changing it from analog to digital technology over the next two years.**

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## *Because of Economic Slump*

# Consultant Sees Thin Market for OA in Europe

**By Brad Schultz**
CW New York Bureau

NEW YORK — An economic slump in Europe — the worst in 50 years — has caused severe reductions in DP department budgets, deteriorating service to the extent that end users account for a "huge upsurge" in minicomputer and microcomputer sales during the past two years, according to a London consultant.

Tony Carter, managing director of DMW Group's European operations, told a recent DMW seminar here that this situation — where end users exasperated with their DP department buy turnkey solutions out of their own budgets — is just one reason why Europeans generally will not buy office automation (OA) on a large scale in the foreseeable future.

Besides the fact that many user organizations in Europe lack money to spend on OA products, Europeans fear the changes in traditional office practices, which new technology would cause, Carter explained. A British government-funded office-of-the-future manufacturer called Nexos is apparently going bankrupt, he pointed out, despite government efforts to have British industry support the venture.

### Viable Markets

About the only viable market for OA in Europe will be multinational companies, especially large and profitable oil companies, the DMW executive maintained.

In 1982, Carter predicted, British DPers will continue migrating to the U.S., West Germany will have a major new telecommunications supplier, eight of France's nine largest computer vendors will be nationalized and teletex will be widespread in Europe.

Not to be confused with teletext (the TV-based home information system piloted in Canada), teletex is a high-speed public electronic mail service designed to allow communications among many different brands of desk-mounted word processors and intelligent typewriters. Already offered in West Germany, teletex will come to the UK and other European nations this year.

### Teletex Revenues

By 1984 teletex annual revenues will top $95 million in the UK and $380 million in all of Europe, Carter indicated. "It's a market which will send shudders through many office equipment companies and force DP giants to rethink their policies," he said.

Teletex eliminates incompatibility among current word processors, he told the DMW seminar, adding it will be difficult this year to sell Europeans word processors not upgradeable to the service. Word processors lacking this ability to upgrade will be obsolete within 12 months, Carter maintained.

U.S. vendors have largely neglected this trend, although European branches of Wang Laboratories, Inc. and IBM are exceptions, Carter stated. Wang has reportedly announced a teletex capability for its Model 2200, a small business system with word processing. But Wang's development center in Belgium has yet to release the feature, Carter added.

Europeans are quite interested in efforts to deregulate U.S. telecommunications, he said. Outside the UK, virtually all telecommunications facilities in Europe are government owned and controlled. British Telecom (a state-owned conglomerate that has reached monopoly status at times during the past several decades) last year released its grip on the British Post Office, which now tries to make a profit.

"We watch the politics of telephones in Washington with some faint amusement; they appear to us complex enough to make fourteenth century Florence seem ever strait-laced," Carter mused. "And we are looking forward to buying a ringside seat for one of America's biggest ever clashes of corporate giants in midtown Manhattan, where on the corner of Madison Avenue and 56th St., AT&T is pushing up a striking, chippendale-roofed corporate headquarters right across from the new Manhattan base of IBM, sheathed in dark green granite.

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According to Carter, Europeans "no longer refer to competition from America and Japan. We've changed that expression to read 'competition from Japan and America.'"

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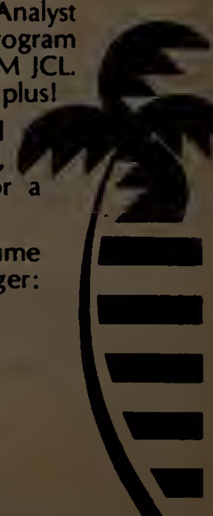

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**RESEARCHER** - Prime Computer, an industry leader in the design, manufacture, sale and service of small and medium-size general purpose digital computers and interactive computer systems, has an immediate need for a highly skilled Researcher to conduct research in Computing and Display systems involving the design and implementation of the following: computer hardware (firmware), low-level software systems (such as Interrupt Handlers, I/O drivers and OS Kernal), graphic/image display systems, intelligent user-aids and realtime processors. Minimum requirements include a Master's Degree in Electrical Engineering and/or Computer Science plus training in the use of hardware logic analyzers, oscilloscopes and microprocessor development Systems; Virtual Memory Operating Systems such as MULTICS and UNIX; and design and verification of microprocessor software and development system aids to operate in conjunction with a Mainframe. Also required is 2 years experience in designing realtime logic, controlled by a 8-bit/16-bit microprocessor, using high-speed TTL logic, bit-slice architectural techniques and microprogrammable control structures; and a demonstrated working knowledge of at least 3 High Level Languages such as PL/1, Algol and Lisp. Starting salary is $32,000 per year for a five day, 40-hour work week and includes medical, life and disability insurance, two weeks annual vacation and other industry competitive benefits. Qualified applicants should respond with resumes only to Charles Cohen, Mail Stop 10A-08-2, Dept. S-M, Prime Computer, Inc., 500 Connecticut Path, Framingham, MA 01701. An Equal Opportunity Employer.

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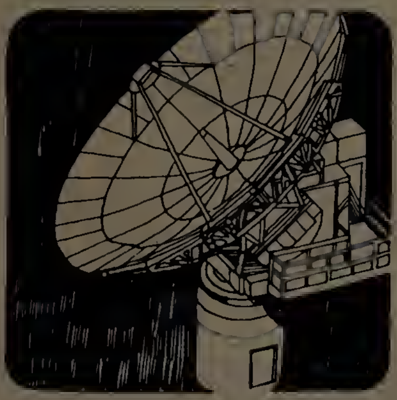
# Software Engineers



## TECHNICAL CHALLENGE YOU CAN COUNT ON!

If you are a software engineer who enjoys and can meet technical challenges, we need you. A wide variety of assignments,from entry to senior level at both our Hanover, Maryland and Palo Alto, California facilities, involving space flight systems, communications and space information systems, offer dual challenges: the opportunity to make significant contributions to major programs, plus the opportunity to increase your software engineering expertise through Case Study Training.

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Along with a technical degree, your background should include top-down design, structured programming and/or design analysis. Experience in PDP 11/70 and real-time communications processing would be a plus. All openings require U.S. citizenship and a current security clearance would be helpful. Accepted candidates may be required to undergo a background investigation.

In addition to challenge, we offer an excellent salary, comprehensive benefits and the potential for positive professional advancement. For confidential consideration, applicants may send a resume to John Tehan, Ford Aerospace & Communications Corporation, Dept. JTJH-4, 3939 Fabian Way, Palo Alto, California 94303, or call him at (415) 494-1793.

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College of Architecture and Planning of King Faisal University expects to fill the vacancies for a Systems Analyst and a Computer Programmer in the course of setting up a "Computer-aided Design Unit" within the College.

Existing computer enviroment consists of Data General host computer and Calcomp graphic terminal, plotter and digitizer. Successful applicants are expected to work in conjuction with architects and urban planners in order to develop new graphic softwares as inter-disciplinary team. Experience in computer graphics is therefore essential, and previous experience in programming for building design and/or urban planning, mapping would be advantageous.

Salary would be commensurate with academic degrees and professional experience. Benefits will include furnished free housing, professional and transportation allowances, two-months annual paid holidays with air fares up to four family members.

Applications with detailed curriculum vitae should be sent to **Dr. Ahmed Farid Moustapha, Dean, College of Architecture and Planning, King Faisal University, 2425 West Loop South, Suite 540, Houston, Texas 77027.**

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## SYSTEMS STAFF SPECIALISTS

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This position requires that the individual possess one to two years experience with the INSCI Payroll/Personnel Package. Expertise as a Senior Programmer/Analyst and a strong working knowledge of COBOL and OS/JCL is essential. If you excel in leadership roles and possess proficient communication skills, we would like to talk with you.

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You will be responsible for quality assurance of applications, control of the data dictionary and selection of productivity tools. Senior Programmer/Analysts with COBOL, IMS, and Data Dictionary experience and a working knowledge of ADF or DMS will be preferred.

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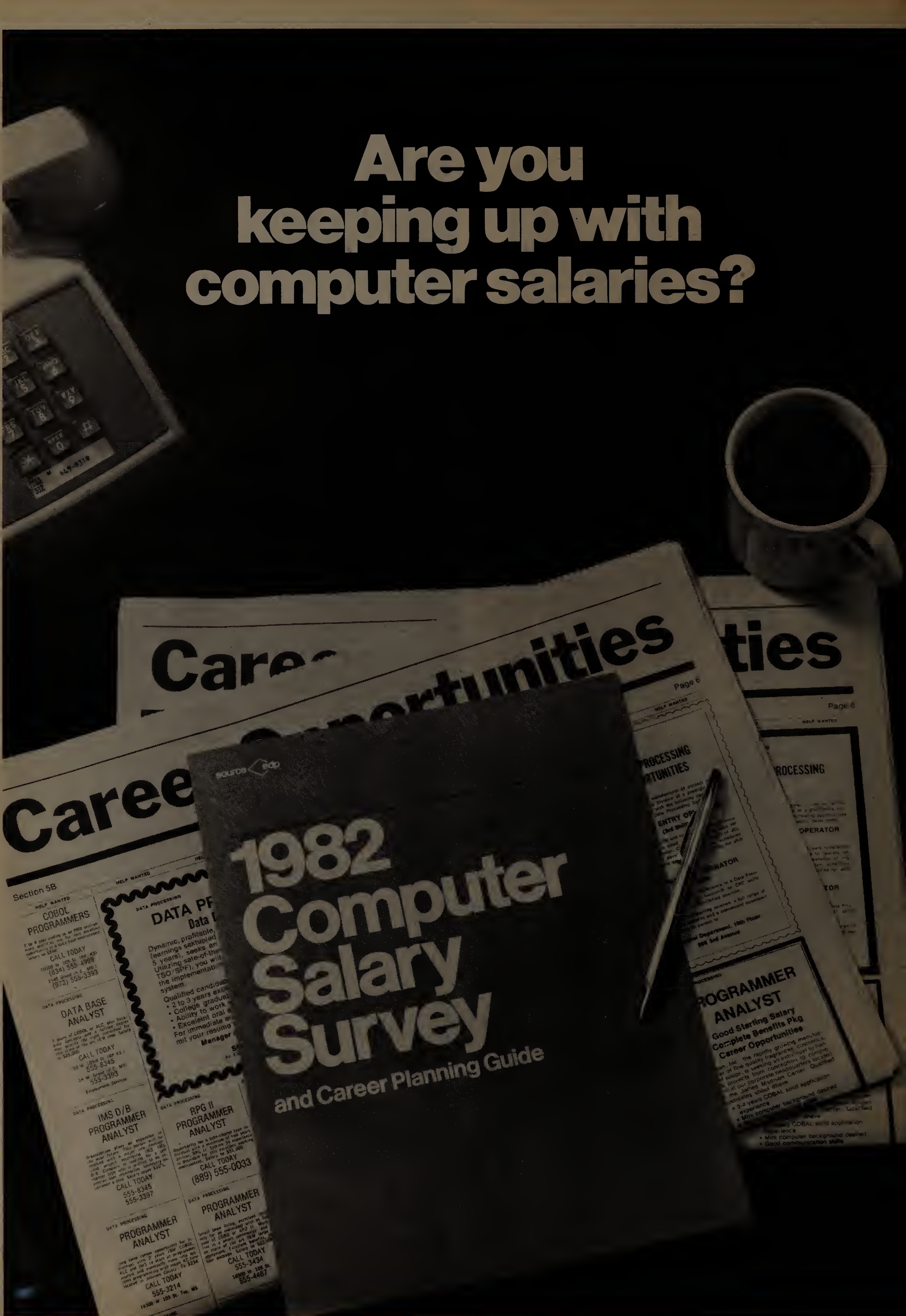
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Career Opportunities
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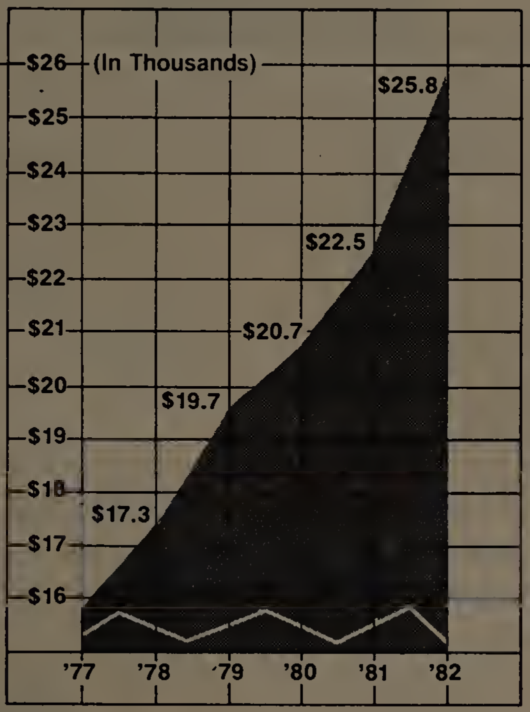
1982 Computer Salary Survey
and Career Planning Guide

# Get the latest compensation data FREE in our new, 1982 Computer Salary Survey.

## With compensation rising rapidly and sweeping technological changes occurring practically overnight in the computer profession, you can quickly become out-of-touch with salary and career trends. Are you—and is your salary—keeping up?



**Computer salaries are soaring. In our 1981 Survey, for instance, Systems Programmers with one-to-two years of experience earned a median income of $22,500. This year, a one-to-two year Systems Programmer will earn $3,300 more than that amount.**

If you haven't kept in touch with computer salaries in the past six months or so, you might be surprised at the changes. Some computer salaries are soaring.

In our recent Survey, new statistics about compensation differences emerged. Here is a sampling:

- While some computer professionals have increased their salaries dramatically during the past twelve months, others, performing the same type of work and having the same general level of experience, have barely managed to keep pace.
- While length of experience in computing bears a direct relationship to compensation, type of experience is often more critical.
- Some emerging technologies—microcomputer systems, for example—are having an unusual impact on compensation.

**Salaries for 48 positions are compared.**

1982 salary data for 48 different position categories—at various levels of experience and computer installation sizes—are reviewed in the report. Included are positions in programming, software, systems design, data communications, mini/micro systems, data base, EDP auditing, computer marketing and more. At both technical and managerial levels. It's the most complete computer salary survey available.

In addition, the Survey provides information on ways that computer professionals can maximize their chances for "getting ahead" through a unique seven-step career management and planning system. In-depth strategies for long-term growth—based on almost 20 years of career research—are also reviewed.

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The new *1982 Computer Salary Survey and Career Planning Guide* is available to you without charge. It's compiled and published annually by Source Edp, who interviews more than 50,000 professionals every year and represents 40,000 client organizations.

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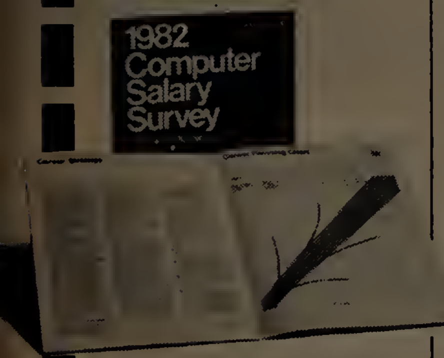

This 28-page report will show you how your salary stacks up. Please call the Source Edp office nearest you for your free copy today. If unable to call, please write:

Source Edp, Dept. CS2
Two Northfield Plaza,
Suite 227
Northfield, Illinois 60093

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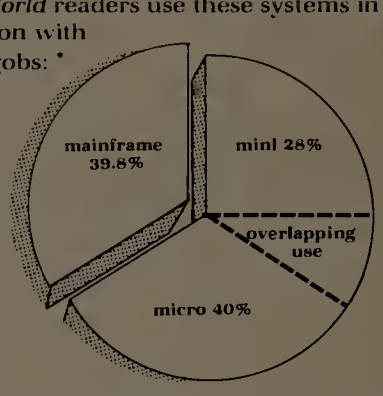

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# FLORIDA! SYSTEMS PROFESSIONALS, JOIN IN OUR GROWTH

Eckerd Drug Company is an expanding retail organization serving the Southern United States from our corporate center located on Florida's thriving West Coast. To continue our rapid growth and maintain our leadership role in the industry we are seeking skilled professionals for the following positions:

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| IMS DATA BASE ANALYST | We're expanding our Data Base Administration Staff. Candidate should have 3 or more years of IMS DB/DC experience in data base design, use of IMS utilities and support IMS application development. Knowledge of IBM's data dictionary would be helpful. |
| LEAD SYSTEMS PROGRAMMER | Expansion of our teleprocessing network requires an individual with 3 or more years experience with ACF/VTAM, ACF/NCP, MSNF or IMS software support. |
| SR. SYSTEMS ANALYST | Requires 5 or more years experience as a Systems Analysts. Retail inventory control experience preferred. Knowledge of COBOL, TSO, SPF, IMS, as well as excellent communication skills a must. |
| PROGRAMMER ANALYST | The successful candidate will have 3 or more years experience working with COBOL, TSO, SPF and IMS. Retail orientation and POS experience preferred. |
| PROGRAMMER | Candidates should have two or more years experience in COBOL, MVS, TSO, SPF and IMS. Retail orientation a plus. |
| PRODUCTION OPERATIONS SUPERVISOR | Requires 3-5 years experience in OS-MVS operations on large IBM main frame and a minimum one year programming experience. Previous data processing supervisory experience a must. |
| OPERATIONS ANALYST | Requires minimum of 2 years experience with construction and maintenance of production JCL. Strong communications skills a must. |

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## Development Technologies

**San Francisco**

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- Experience in State-of-the-Art structured programming and design techniques, and systems development life-cycle methodology.
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## Director of Computer Services

Grinnell College is a selectiva, 4-year, privata liberal arts college of 1,230 students and 115 faculty members. Computing operations are based in two DEC PDP 11/70 central processing units. Interacting terminals: 60 for academic computing (750 student accounts) and 25 for ADP. The college is committed to the principle of stressing general education in computing. Staff of 12 plus Director and Including experienced Associate Director of Academic Computing. All units af administration involved in use of computer. College Is very Interested in substantial further development of both academic and administrative use.

Wa ara seeking person with: (1) advanced academic credentials; (2) knowledge of technical aspects af computing, praferably with axperience in RSTS environment; (3) significant axperience in administrative data processing in an academic setting and ability in administrative management; (4) knowledge of and axperience with programming languages such as BASIC and FORTRAN, (5) experience with Data Management Systems.

This Is a full time, 12 month position available immediately. Salary highly competitive. Application deadline Feb. 12, 1982. Send resume and 3 letters of recommendation ta Waldo S. Walker, Executive Vice President, Grinnell, College, Grinnell, Iowa, 50112.

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CSIRO has a braod charter for research into primary and secondary industry areas. The Organization has approximately 7,500 employees - 2,700 of whom are research and professional scientists - located in divisions and sections throughout Australia.

GENERAL: The Division of Computing Research operates an Australia-wide computer network to provide a computing service to CSIRO, Government and other users throughout the country. Major host computers used by the Division include a CDC Cyber 76, a CDC 730, a FACOM M190, two FACOM M150s and a Two Pi V32, and services are offered using the CDC operating systems SCOPE 2 and NOS/BE, FACOM OSIV/F4 and IBM VM370/CMS. The host computers are connected to each other and to the long distance communications network by a local high speed (50 million bits per second) contention network using a Network Systems Corporation HYPERchannel.

DUTIES: As a member of the Division's Ultra High Speed and FACOM Systems Section, carry out development projects, and provide support and consulting functions for the FACOM host systems and the HYPERchannel local network.

QUALIFICATIONS: A PhD or equivalent in computing science or equivalent in computing science or a related field. Proven experience in communications and systems software development is essential.

TENURE: Five years with possibility of extension. Superannuation benefits available.

APPLICATIONS: In writing and stating full personal and professional details, the names of at least two references and quoting reference number A1121 should reach:

**The Chief**
**Division of Computing Research**
**CSIRO**
**P.O. Box 1800**
**CANBERRA CITY ACT 2601**
**AUSTRALIA**

by 19 February 1982

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# Account Managers, Programmer Analysts, Systems Engineers

## NCR Data Pathing Division-a leader in turnkey factory data collection systems-invites you to join our nationwide marketing and development teams.

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**Detroit, MI**
**Milwaukee, WI**
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# National Technical Support Manager

## Computer Graphics

This individual will direct a staff providing hardware/software utility and applications support including evaluation and pre/post sales consultation. Provides leadership and direction for the System Analyst Support group in the U.S. sales organization. Coordinates and directs new product support and training.

Candidates should have 3-5 years' second level management experience in a technical support, sales/marketing environment. Thorough understanding of hardware/software and data communications within the computergraphics/computer peripherals field. Knowledge of high level programming languages and networking with strong systems background. MSCS or equivalent experience.

Tektronix, Inc., a Fortune 500 company, develops, manufactures and markets internationally recognized precision electronic measurement instruments, computer graphics, computer peripherals and related electronic instrumentation. Headquartered near Portland, Oregon and supported by sales and service professionals throughout the U.S., we are within a two hour drive of the Cascade Mountains and ocean beaches.

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# SYSTEMS DEVELOPMENT PROFESSIONALS

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MIS Services at Travenol Laboratories enjoys a long-standing management commitment to the implementation and maintenance of an exceptional systems development environment. We are now operating IBM 168, 3033 and 3081 (on order) under MVS and IMS/VS. With this hardware and more on the way, we plan to grow fast between 1982 and 1985.

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Project work involves Bill Of Material, Master Scheduling, Inventory, Standard Cost and MRP.

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Positions involve on-line systems development for Sales Reporting, Sales Compensation, Sales Price Forecasting and Tracking.

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Opportunities are available at a variety of levels for individuals in each of the areas described above. Experience should include COBOL systems and programming with knowledge of MVS, IMS/VS, DB/DC and TSO preferred.

### TRAVENOL: A PEOPLE COMPANY

In addition to the challenge and the excitement generated by the success of our leading international medical care corporation, Travenol employees enjoy a highly competitive salary and benefits package, planned career paths, profit sharing and employee stock purchase plan. For consideration, send a resume in strict confidence with salary history, to: John Coit.

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Should you be interested in finding out more on the above positions. CALL GEORGE ANDREWS COLLECT AT 305-584-8404, or forward resume to my attention. All responses held strictly confidential. Serious inquiries Only. For immediate attention and results contact:

**George Andrews**
**A & S ASSOCIATES**
**3608 W. Broward Blvd.,**
**Ft. Lauderdale, Florida 33312**
**305-584-8404**

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# SENIOR SYSTEMS PROGRAMMER

Opening for sharp, experienced Systems Programmer. Minimum two years experience supporting IBM VM and VS/1. Requires excellent OS/VS JCL and Assembler skills, SYSGEN experience, SMP. ADABAS, HASP, and/or MUMPS a plus. Management potential if desired. We have multiple CPUs, database, large growing DC network, minicomputers, and great working environment. Salary upper-twenties to mid-thirties. Reply in confidence to:

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The following positions are open to Data Processing Professionals with the background and expertise to meet our qualifications and requirements:

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Openings on several levels that require a minimum of 6+years experience in OS, COBOL Programming, as well as a thorough knowledge of VSAM, CICS, OS/JCL & Utilities, and user interface. Knowledge of DBMS concepts and techniques necessary for senior level responsibilities.

### SYSTEMS ANALYST

Must have 5-7 years experience in Programming, VSAM, and random access methods for medium to large data bases. OS, JCL, and Utilities, CMS, CICS required.

### PROGRAMMERS

3-5+ years background will qualify you for one of several programmer positions. Must be familiar with OS/COBOL and knowledge of Modular Programming techniques, along with use of CAPEX Facility. Demonstrated experience with OS, JCL & Utilities, CMS, CICS bring added rewards.

We offer the successful candidate a sound and comprehensive compensation package, in a winning environment. Please send detailed resume, in confidence, or call:

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# FLORIDA FLORIDA

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The opportunities exist in Miami, Ft. Lauderdale, and Tampa areas. We are assisting our client in filling these full time permanent positions. The client demands excellence, and rewards it with better than competitive salaries and bonuses, together with an excellent company paid benefits package, incl. tuition reimbursement and PAID OVERTIME to top professionals with a minimum of two solid years of experience (travel may be available, if desired).

The client is a people oriented company, who, based on an individual's merit, cater to providing their personnel with the opportunity for both technical and financial growth. Send resume (handwritten is okay), with your salary history to:

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New position to keep pace with demand in strong but small department. Also half-time appointment available. ACM-DPMA coursework with options in business, mathematics or electronics. Teaching of systems analysis especially sought. Ph. D. desired. Rank: Assistant or Associate, depending on qualifications. Competitive salary.

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Candidates must have a minimum of 2 years programming experience and strong IBM/ALC skills. Degree preferred but not required.

ADR offers a highly desirable work environment which allows employees advancement into new and challenging assignments at a rate commensurate with their interests and ability. ADR also offers outstanding benefits and excellent compensation.

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Responsibilities include: researching, developing, and implementing operating system control programs and related software; consulting and advising other departments; and assisting in the research and implementation of new hardware.

Applicants must have a thorough knowledge of assembler language as well as VM and CMS internals and externals; project management and good communication skills. Knowledge of COBOL or similar language in a CMS environment and experience with other software such as MVS, TCAM, BTAM, and CICS are desirable.

Salary range to $36,000 depending upon qualifications and experience. Send resume with salary history to Mary V. Scott, Recruiting Office, Ætna Life & Casualty, 900 Asylum Avenue, Hartford, CT 06156. An equal opportunity/affirmative action employer.

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## SOFTWARE PROFESSIONALS

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To qualify, you should have at least 2-5 years of application and/or systems programming experience and a solid knowledge of RSTS and/or TOPS-10 and related Layered products. Degree in Computer Science preferred but not required.

Digital will provide competitive salaries, generous benefits, and relocation assistance.

Call us toll-free, 8:00 a.m. - 4:00 p.m., Monday - Friday at (800) 525-7101. Or send your resume to: Larry Crockett, TSC Personnel, Digital Equipment Corporation, Dept. 0118 3807, 4405 N. Chestnut Street, Colorado Springs, CO 80907. (If in-state call (collect) (303) 599-0549.)

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# DATA PROCESSING PROFESSIONALS

DATA RESOURCE CORPORATION, headquartered in Atlanta, is a leader in quality Contract Programming and Consulting. Our continued growth in the Southeast and Southwest has created opportunities for versatile Professionals with state-of-the-art skills in Programming and Systems Design.

We are currently seeking individuals with at least 3 years of diversified programming experience, strong technical backgrounds, and who possess the desire to work in various, stimulating Data Processing environments. IMS and CICS skills are of special interest, as are the abilities to travel or relocate.

We can offer you competitive salaries and comprehensive benefits programs, including bonuses and profit sharing. If you've been searching for a growth opportunity with a dynamic and progressive company with a Management team that "puts people first," then DRC is your answer.

For immediate consideration, please call BECKY FINLEY COLLECT at (404) 633-9387, or send your resume to:

DRC

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**Suite 110**
**Atlanta, GA 30329**
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# SENIOR PROGRAMMER

TRW Semiconductors, a leader in the production and development of quality RF and Power Semiconductor devices, has an opening for a SENIOR PROGRAMMER in the MIS department of our Lawndale facility.

Our Senior Programmer will be heavily involved with users and manufacturing systems development.

Requirements include a BS in Computer Science, Mathematics or equivalent plus a minimum of 2-3 years experience in Cobol programming. Experience with manufacturing and P.C. systems preferred. Familiarity with Fortran, on-line, data-base and Prime, HP or other minicomputers also preferred.

If you are interested in a company where you make a difference, and you are qualified for this position, please send your resume and salary history to:

Nancy Hughey, Recruitment Administrator
TRW Semiconductors, Section 201
14520 Aviation Blvd.
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If you feel you have the background we need, talk to us about the future you can start building now. Send your resume and salary history to: Jerald Harris, Digital Equipment Corporation, Dept. 0118 3807. 6200 Savoy Drive, Suite 1000, Houston, TX 77036. Telephone: (713) 977-7575 (Collect).

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Applicants should meet the following requirements:

2 years experience withn an IMS/DB/DC environment.

Knowledge of IBM data dictionary utilization and exposure to secondary indexing and logical related data bases.

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# Sunbelt IBM

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IBM 4331 2 yrs., CICS a must, OS/VS1, COBOL, Salary 25-28,000, NC location.

**SYSTEMS PROGRAMMERS**
IBM 370, 158, DOS/VS/VSE, Assembler a must. Salary 28-35,000, VA location.

**SYSTEMS PROGRAMMERS**
Amdahl or IBM Sysgen, MVS, JES2, JMS/DBDC, Minimum 1 yr. Assembler experience, VA location, Salary up to 36,000.

**PLANNING ANALYSTS**
IBM OS/MVS, statewide CICS network, VTAM nice, experience in identification, analysis and development of systems, VA location, Salary 20-30,000.

**PROGRAMMERS**
IBM experienced-ready to move to Programmer Analyst. COBOL plus any two of these CICS, ALC, PL1, RPG, BASIC, Easytrieve, VA location, Salary 20-27,000.

**CICS** - Candidates, 19 openings in Southeast, salary 20-35,000 range.

**SYSTEMS PROGRAMMER**
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# Programmer Analyst

Leading Florida retailer is looking for an aggressive COBOL Programmer Analyst. Minimum of five years experience in new program development required. NCR medium to large scale mainframe experience desired. Knowledge of Cincom, TOTAL, Data Base and NEAT/3 a definite plus.

We offer the right individual a progressive growth environment and a competitive compensation package.

Qualifying applicants send resume with salary history today, in complete confidence. **(305) 625-2681.**

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# SOUTH FLORIDA

## SR. SYSTEMS ANALYST

Find challenge and opportunity on Florida's Gold Coast, just north of Palm Beach. Hospital has immediate need for a specialist in ADS Health Care Package. You will develop and install the package, and supervise the programming staff. Relaxed life style, location near beaches. Company pays relocation, liberal benefits and all fees.

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# DATA PROCESSING PROFESSIONALS

McLEAN TRUCKING COMPANY offers outstanding growth opportunities at its Winston-Salem, North Carolina headquarters. Our systems and programming staff is expanding and we are seeking experienced individuals for the following key positions:

## SYSTEMS PROGRAMMER

We are seeking an individual with a minimum of 2 years experience as a MVS/OS Systems Programmer, with appropriate degree required.

## SYSTEMS ANALYST

We are seeking an individual with a minimum of 5 years experience, one of those years preferably as a Systems Analyst. Candidate should have CICS on-line systems design and programming experience. Degree preferred with DL-1 data base experience preferred.

You will find these opportunities and our benefits program equally rewarding. Please send resume giving educational background, salary requirement and work experience to:

**Director of Management Development**

**McLEAN TRUCKING COMPANY**

**P.O. Box 213**
**Winston-Salem, NC 27154**
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Qualified applicants should have a detailed knowledge of the IBM computer marketplace and experience marketing IBM computer equipment. Applicants for the directors position should have extensive experience in the dealer marketplace.

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# SENIOR SYSTEMS PROGRAMMER

West Virginia Network for Educational Telecomputing has an immediate opening for a Senior Systems Programmer on a large scale IBM - Compatible system. This position performs complex systems programming tasks and provides technical assistance to junior level systems programmers. The successful candidate will assume an active role in the conversion of an MVT/VS1/HASP system to MVS/JES2. Requirements include a Master's Degree and three years experience or a Bachelor's Degree and five years experience, or equivalent. Experience with MVS, TSO, and/or CICS is desirable. Medium-sized university city provides relaxed academic setting. Salary commensurate with experience. **Apply by February 5, 1982 to: Personnel Officer, WVNET, 837 Chestnut Ridge Road, Morgantown, WV 26505. Telephone (304) 293-5192.** An Equal Opportunity Employer.

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# SOFTWARE ENGINEER

Educational requirements for this position are a Masters Degree in either Mathematics or Computer Science.

Responsibilities include: An identification and analysis of system functions and the manfacutring activity and it's interfaces. Essential tools include ALGOL, DMSII, Linear and Non-Linear Mathematical modeling simulation modeling MRPII and statistical interpretation. Project objective is the design and implementation of Hierarchically integrated buffered modularized, redundant-partitioned adaptive software.

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# DATA PROCESSING PROFESSIONALS

As part of the largest private health insurance system in the world, Blue Cross and Blue Shield of Kansas City is an expanding, progressive organization where advanced automation and MIS will continue to play a central role in our success. Those who join us will discover a professional project team environment with opportunities to learn and expand their knowledge of TELEPROCESSING and DATA BASE in new and enhanced batch and on-line systems. Recognize your growth potential if you are a competitive, results-oriented individual with leadership abilities.

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A highly-visible corporate-wide project provides a unique opportunity for a programmer analyst to have wide-scope responsibilities including applications design and analysis, programming, product evaluation, problem resolution and user coordination. Requirements include 5+ years experience in an IBM shop with knowledge of IMS DB/DC and the ability to work independently.

## SR. SOFTWARE PROGRAMMER

3 years experience as a software programmer with the ability to generate and maintain MVS and Jes 2 using SMP. Some knowledge of internals required. Prefer experience in TSO/SPF and PCF, VTAM, CMF, TLMS and Librarian.

Our environment consists of an IBM 3032 operating under MVS with IMS DB/DC and TSO/SPF. We offer flexible hours, highly competitive salaries, and excellent benefits including a dental plan, credit union, educational assistance and relocation package. For immediate consideration, call Kathy Jensen, collect, 816-932-5262, or forward your resume, in confidence, to her attention.

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We're seeking a minimum of 5 years experience supporting and supervising a CICS and/or on-line network running on a 3032 or largest computer complex. Plan and control tasks performed by a technically-oriented staff who are responsible for implementing and maintaining CICS/data base and related software.

In addition to a fine starting salary, you will be receiving a complete package of fringe benefits including medical/dental and life insurance, retirement plan, a company matched savings plan, tuition reimbursement and a relocation program. Send resume including salary history or call COLLECT **John Wallin, (714) 640-3097.**

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- **Project Leaders**
- **Programmer/Analysts**

As we expand our client base, opportunities exist for key contributors to implement systems for commercial clients. We are seeking talented individuals from varied applications backgrounds from Programmers with 2 or more years of experience to Project Managers with a minimum of 10 years experience. A degree, experience with structured COBOL programming, and a familiarity with IBM Systems are preferred.

*These positions, located in our new Wellesley, MA Regional Office, require minimal travel and offer opportunities for client interface. If you'd like to be in the vanguard of your profession, please forward your resume and salary history, in complete confidence, to Alan Ameigh, Raytheon Service Company, 2 Wayside Road, Burlington, MA 01803.*

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Join our Compiler Team and participate in the development and support of our Program Development Software. Take on the challenge of producing highly optimized code for a Parallel Pipelined Processor.

A BSCS or equivalent is required, as is training in compiler implementation. VAX or IBM experience is desirable.

**Software Engineer**
We need an individual with strong programming skills to develop software tools for the development, maintenance, test, and validation of multi-host software systems.

Requires a BSCS or equivalent, plus proficiency in FORTRAN and assembly level languages.

If you are qualified and interested, call **(collect) Dan McGee at (503) 641-3151, ext. 152,** or send resume and salary history to: **Floating Point Systems, P.O. Box 23489-CW 11, Portland, OR 97223.**

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# SOFTWARE SALES MANAGER

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Computer Horizons Corp., a national data processing services company is seeking an aggressive and creative individual to participate in the lucrative sales end of our business in either our Southwest regional headquarters based in Houston, Texas or our West Coast headquarters based in San Francisco. The successful candidate should have a minimum of 5 years sales experience. We view experience in the data processing industry...particularly with the sale of custom software services as a definite plus.

We seek the determined individual who is:
- **Goal Oriented**
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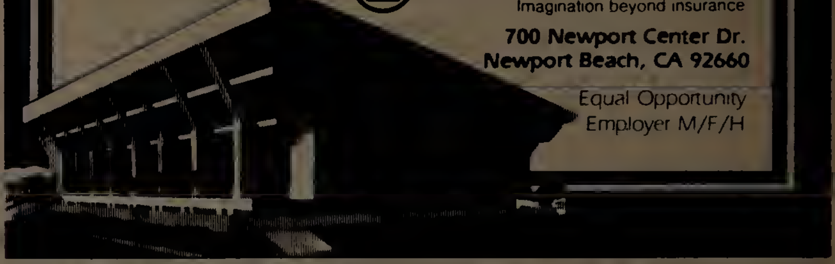

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Manufacturing company, OS/MVS IMS shop. Responsible for software support, netwk. management, & DB admin. Current technical mgmt exper. required. To mid $40's plus bonus. Full relo & fee pd.

Suite 1109, Stemmons Tower W
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**IMS DB**
**ANALYST TO $33K**

Texas energy concern is expanding it's DB efforts two plus years. IMS experience req'd. Great relo pkg.

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Excellent Tulsa companies are providing superior opportunities for programmer/analysts. All with excellent benefits and competitive starting salaries:

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(918) 747-3621

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# KANSAS CITY

**DB Administrator**
**IMS**

Colorado client seeks an exper. IMS Data Base Administrator, excellent opportunity.

**Salary to upper $30's**

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Kansas 66202, (913) 236-8288

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# DIRECTOR OF COMPUTING SERVICES UNIVERSITY OF COLORADO AT DENVER

The Director manages the Computing Services Department, which includes both administrative d.p. and the academic Computing Center. The University of Colorado at Denver is a preprofessional, professional, and graduate institution of the four campus University of Colorado system. UCD now serves almost 10,000 students.

The Director coordinates UCD's participation in the University's expanding network of systems and is responsible for planning and implementing the growing computer resources at UCD.

The successful candidate will possess management capability, coordinative skills, and a commitment to affirmative action. Specific minimum qualifications are a bachelor's degree and five years in computer service management. Advanced degrees are desirable, as is experience in education. Salary will be based on qualification of the applicant selected.

A resume with salary history should be directed to **W.D. Murray, Box 168, University of Colorado at Denver, Denver CO 80202.**

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# CHICAGO

**RPG II OR III EXPERTS**

Currently we are representing several clients in pursuit of RPG II system 34 and 38 people. If you feel confident in your programming and analysis and are ready to assume broad responsibilities give us a confidential call. $36.000.

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# BANK SYSTEMS PROFESSIONALS

Texas American Bancshares, Inc. is seeking to fill a few key management positions in its rapidly growing systems area. If you are currently responsible for one of the following bank systems or have bank EDP management experience, you will want to find out about your career opportunities.

## MANAGER, SYSTEMS DEVELOPMENT & MAINTENANCE

- Excellent Communication Skills
- In-Depth Banking Systems Experience
- Proven Management Ability over Sizeable Staff (30-40)
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- Technical Expertise with IBM Hardware, COBOL, and CICS Software

## APPLICATIONS PROFESSIONALS

- Design, Program, Document, and Maintain Banking Systems
- Familiarity with IBM Hardware and Software
- Background in COBOL and CICS preferred

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DOS Check, CPCS, ALC

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COBOL, CICS

Texas American Bancshares, Inc. is the seventh largest bank holding company in Texas. We offer an excellent benefit, salary, and relocation package to qualified professionals.

Send resume and salary history
in confidence to:

**Bob Silver**
**P.O. Box 2050**
**Fort Worth, TX 76101**

TEXAS AMERICAN BANCSHARES INC.

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# CARACAS VENEZUELA

## Research Programmer/Analyst

Need experienced Programmer/Analyst to staff internal consulting position in a petroleum R & D Institute. Should have a minimum 5-10 years experience in computing support in an R & D environment, B.S. degree - M.S. preferred in a technical discipline. Duties will include computing support of researchers in areas of simulation, modeling, finite element analysis, graphics and etc. Should have background in IBM VM/CMS, S2000, Mark IV, APL, PL/1, FORTRAN, DISSPLA, Tellagraf, etc. Knowledge of Spanish desirable. Please rush resume with salary history to client's consultants (no agencies please).

**K.A. Drexhage & Associates, Inc.**
**750 Welch Rd., Suite 204**
**Palo Alto, CA 94304**

# Field Engineers

## Disk Experience Preferred

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In 1982, we plan to more than double the size of our Field Engineering Force. This growth dictates the need for additional managers, specialists, etc. If you have the potential to grow . . . Don't miss this opportunity!!

System Industries manufactures minicomputer peripheral equipment and systems. We're the world's largest independent supplier of disk memory subsystems. We're small enough to really experience the team spirit that has made us so successful. And the contribution of every individual at System Industries has given us all the opportunity to experience rapid growth as well.

Please send your resume to **Bill Pugelli, 1855 Barber Lane, Milpitas, California 95035. Or call him COLLECT at (408) 942-1212.** We are an equal opportunity employer.

**System Industries**

# OPERATIONS ANALYST

## Disaster Recovery/Data Security

Humana Inc., one of the nation's leading hospital companies, has an excellent opportunity for a self-motivated individual to assume a key role in the Data Processing Department. Environment is a large MVS CICS multi-CPU with IBM 3081/4341 as the major system. Responsibilities will include support of all phases of data center operations.

The qualified candidate will have 5-7 years data processing experience as well as experience or exposure to disaster recovery and data security. A college degree is preferred.

A salary commensurate with experience, outstanding benefits package and relocation assistance will be offered. For consideration, send confidential resume with salary history to:

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**Humana**

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Louisville, Kentucky 40201

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Join our rapidly growing computer service company. We offer unlimited opportunity to those with initiative and ability. Systec provides a full benefit package, top salaries, and participation in Systec's future.

SPECTRA 70 Opportunity for field engineers with Spectra 35/45 experience - US and overseas locations available. We also need IBM 360/370, 303X engineers.

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**Phone: 800-327-2202 In Fla.-305/323-0230**

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All fees and relocation paid. $18-35,000.

If you have a BSEE, BSCS, BS in Mathematics or Physics or equivalent, we need you right now.

**For Business:** OS/DOS/IMS/CICS/MVS/JES Prog/Anal/Systems/Data Base. All large scale installations.

**For Scientific:** experience in the computer, communications, semiconductor, or aerospace/defense industries.

Your name, resume, and present employer will not be given out without your permission.

For sincere personal service, please send a confidential resume to:

**Dan Pullman (602) 274-5660**
**PULLMAN PERSONNEL**
**3033 North Central Ave. Suite 401, Phoenix, Arizona 85012**

# PROGRAMMERS

Denver based service bureau is looking for programmers to fill positions within it's Equipment Dealer Services On-Line processing division. 2 years experience required with Basic + 2, DEC Hardware & RSTS Operating Systems. Requires a desire to work with large and complex applications programs covering the full array of business applications from Inventory Control & General Ledger. Salary commensurate with experience. Call **303-773-1313** or send resume to **Personnel, P.O. Box 5606 TA, Denver, CO 80217**

# SPECTRUM TELEVISION

**SPECTRUM**, a leader in the subscription television industry is seeking an experienced FORTRAN Programmer. Hardware includes: a Prime 750, and a H/P 1000L. Applicant should possess 2-3 years FORTRAN programming experience on Prime hardware, utilizing a MIDAS file handler. Knowledge of INFO is a plus, and a degree in business or computer science is desired.

Spectrum offers an excellent compensation package, including free subscription television and unlimited promotion possibilities.

Send resume with salary history:

**Spectrum Television**
**501 W. Algonquin Road**
**Arlington Heights, IL 60005**

***EOE M/F***

# SYSTEMS PROGRAMMING
## TO $37K

The Department of Computer Services provides data processing and technical consulting services for the Commonwealth of Virginia through five large, high technology computer centers.

We are looking for a senior systems software individual with strong leadership ability and experience in large mainframe, timesharing environments such as IBM 3033, Univac 1100/84 or Amdahl 470.

We offer competitive salaries, relocation expenses, excellent educational benefits and state-of-the-art technology.

If you are looking for a unique place to live and a challenging career, please submit your resume to:

**Bob Rainey**
**Employee Relations Director**
**Department of Computer Services**
**513 Eighth Street Office Building**
**Richmond, Virginia 23219**

EOE/M-F

# COMPUTING CENTER DIRECTOR

The duties are to plan, organize, and direct the activities of Lehigh University's centralized Computing Center, to include: (1) coordination of computing activities with those of instruction, research, and administration; (2) development and initiation of actions to assure a financially sound operation; (3) planning and implementing organizational, facility, and major service changes; (4) supervision of 23 full time staff members; and (5) advising the University administration and faculty computing matters.

Particular experience desired includes: (a) faculty background - preferably a doctorate; (b) demonstrated management capability in a service mode; and (c) technical acquaintance with computer systems and their application.

Please forward name, address and brief resume for futher information to:

**J. I. Goldstein**
**Lehigh University**
**Assistant Vice President for Research**
**447 Whitaker Lab #5**
**Bethlehem, PA 18015**

AN EQUAL OPPORTUNITY EMPLOYER M/F

# DATA PROCESSING DIRECTOR CITY OF GRAND RAPIDS MICHIGAN

**DUTIES OF POSITION:** Direct the administration of the centralized data processing function and the telecommunications network.

**SALARY RANGE:** $31,727 to $40,491 per year.

**REQUIREMENTS:** At least eight years of progressively responsible experience in data processing program direction and a bachelors degree in business administration or related field.

**AREA:** Grand Rapids is located in the Center of Western Michigan's Winter-Water-Wonderland offering year round recreational opportunities. Ours is a pleasant city in which to live.

TO **APPLY:** Submit complete resume including salary requirements to Mr. G. Stevens Bernard, City Manager, City Hall, Grand Rapids, Michigan 49503.

# TELECOMMUNICATIONS PLANNER

**Solid growth corp. seeks exp'd. telecommun. pro. for visible sr. staff position to develop corp. network strategies. Salary to $37,000 (fee paid). Contact Stan Durbas or Carol Wilson.**

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**Personnel Consultants**

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**J. C. Dayvault**
**R.P. Rita, Inc.**
**4522 Boy Scout Blvd., Suite 100**
**Tampa, Florida 33607**

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# FACULTY POSITION IN COMPUTER SCIENCE

Applications are invited for tenure-track, full-time undergraduate teaching position in computer science, starting August 1982. Rank and salary based on qualifications and experience, up to $31,000. Master's degree in computer science required. Ph.D. preferred. Business, industrial, or teaching experience required. Exceptions for degree requirement in computer science considered only if candidate has extensive academic and professional experience in computer science. Applications accepted until position is filled. Send vita, including unofficial transcripts, and letters of recommendation to: **Prof. Ralph E. Kuhn, Chairman, Computer Science Search Committee, LOCK HAVEN STATE COLLEGE, Lock Haven, PA 17745.** An affirmative action, equal opportunity employer.

# PROGRAMMER ANALYST

The City of Highland Park is accepting applications for a Manager of Computer Services to run a small DP Department. Responsibilites include: Systems Analysis, Design, Programming and implementation of applications systems; software and hardware contract negiotation and supervision; and troubleshooting. The position involves COBOL in a minicomputer environment. BS in Computer Science or related field required along with 2 year experience in Data Processing. Salary open. Interested persons should apply to:

**Personnel Office**
**City Highland Park**
**1707 St. Johns Avenue**
**Highland Park, IL 60035**
**(312) 432-0800**

**We are an affirmative/equal opportunity employer**

# CONSOLE OPERATOR

NCR: 8250/84xx/90x0, IRX, IIBS or CIF experience. Apply by Jan. 31, 1982. Resumes to:

**COMPUTER &**
**IMFORMATION**
**SYSTEM DEPT.**
**342 Madison Ave,**
**NYC 10173**
**(212) 986-1689**

# COLORADO MOUNTAIN COLLEGE PROFESSOR COMPUTER SCIENCE/DATA PROCESSING

Colorado Mountain College invites applications for faculty position teaching transfer and occupational courses in Computer Science/Data Processing beginning in September. Five years work experience required; Masters Degree desirable. A comprehensive Jr./Community College, CMC - East Campus is located in the heart of the central Colorado Rockies.

Contact: Mr. George Bagwell, Colorado Moutain College-East Campus, Leadville, CO 80461, (303)486-2015.

**Programmer/Analyst.** The Department of University Computer Systems is seeking a highly qualified individual with state-of-the-art experience in designing, developing and maintaining on-line administrative systems; who will formulate, flowchart and code complex programs from written specifications; test and debug programs and all components of a system, prepare documentation and procedural manuals for user departments, computer operations and I/O control. Minimum qualifications: three (3) years of programming and systems development experience in on-line systems. Additional background desired: Bachelor's Degree, working knowledge of COBOL or PL/1; MVS, VM Operating Systems; CICS: OS, DOS, JCL; CMS or TSO Development Experience. Send resume to **Mr. Robert D. Mays, U-138, Director of Computer Systems, University of Connecticut, Storrs. Ct. 60268 by February 1, 1982,** An Equal Opportunity/Affirmative Action Employer.

# Programmer-IBM System 34

Basic & Fortran programming ability for production and adaptation of engineering software. Software includes coordinate geometry (surveying) & piping network analysis. Subdivision plotting & automated drafting.

**Robert E. Owen & Assoc., 2300 Fla-Mango Rd., West Palm Beach, FL 33409, 305-689-6900**

# ATTENTION PL/1 PROGRAMMERS

We are a fast growing distribution company located in Harrison, AK in need of PL/1 Programmers. Our system consists of DOS/VSE, CICS/VS, VS and DL1 running on a 3031 and a 4331.

We offer an excellent benefit package. Salary commensurate with experience.

INTERESTED? Send resume to **John R. Berry, Personnel Manager, Mass Merchandisers, PO Box 790, Harrison, AK 72601**

# PROGRAMMER

Work on a permanent team involved in an international investigations system handling money transfer inquiries. Design & program report layouts. Research in EAZYTRIEVE to check for language compatability in current systems. 1 year or 1 year data analysis & programming experience. Bachelors degree or equivalent in Computer Science. Must have knowledge of COBOL, CICS, IMS, DLI. $446.50 per week to work 40 hours/5 days/wk. **PLEASE SEND RESUMES: Pinkerton Computer Consultants, 11 Broadway, New York, N.Y. 10006.**

# SENIOR PROGRAMMER ANALYST

Great Western Sugar is a Denver based company. Our information services department is designing and implementing new application systems for the company's IBM 4300 system. We need a Senior Programmer Analyst with three years manufacturing application systems on a medium to large scale computer (preferrably IBM) using COBOL. A college degree and knowledge of Data Base is a plus. Please send resume to:

**PERSONNEL DEPARTMENT**
**GREAT WESTERN SUGAR**
**P.O. Box 5308 TA**
**Denver, Colorado**
**80217**

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**201 493-3232**

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# VM Systems Programmer

IF YOU HAVE a minimum 2 years' experience and want to work in an VM/CMS VS APL shop, call **Joe Roberto at 404/873-3592. Whittaker Medicus, 1175 Peachtree Street NE, Suite 1602, Atlanta, GA 30361.**

*e/o/e/m/f*

# CAREER GROWTH

## That's what Technical Software Specialists can expect at Ætna

Ætna Life & Casualty is the nation's largest diversified financial company. Our size translates out to more project opportunities for Technical Software Specialists like you. Plus, Ætna training programs will add muscle to your already impressive background. For instance, learn the technical internals of teleprocessing software. Access methods. And data base management systems. Lots of project opportunities. Heavy duty training. You know what that means. Career growth, pure and simple.

Right now Ætna is scouring the country for top-notch Technical Software Specialists hungry for advancement. Once on board you'll support the development of on-line data base systems. This includes logical and physical data base design. It also includes providing guidance to programmers on DB/DC protocol.

The salary you command is directly related to the experience you've got. It's highly competitive and worth investigating. Then there's Life, Medical, Dental and Disability insurance. And that's just for openers.

If your strength is in BAL, and you have a working knowledge in MVS, TCAM, IDMS, CICS, or DL-1 send your resume to Mary Scott, Corporate Recruiting, Ætna Life & Casualty, 900 Asylum Avenue, Hartford, CT 06156. An equal opportunity/affirmative action employer.

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# SAN FRANCISCO

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(415) 434-1900

**Jim Dupre/Linda Strickland**
2 Palo Alto Sq. #212
Palo Alto, CA 94304
(415) 493-8700

675 N. 1st St. #609
San Jose, CA 95112
(408) 293-9040

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# Computer Engineers

Now is the time to discover the special benefits of a career with us. We're Arizona Public Service Company, headquartered in Phoenix, Arizona.

We are currently involved in the construction and staffing of the 3 unit Palo Verde Nuclear Generating Station, located 50 miles west of Phoenix. We have immediate openings for Computer Engineers.

Successful candidates must have DEC/RSX 11, HW/MOD 400, SEL/RTM and/or MODCOMP/MAX 4 software experience.

At Arizona Public Service Company you will be able to combine excellent benefits, salary, and career potential with a dynamic Arizona lifestyle.

If you are interested in a challenging opportunity with us, please submit a resume including salary history to:

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**ARIZONA PUBLIC SERVICE COMPANY**
P.O. Box 21666, Station 8000
Dept. CW 1228
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# TELECOMMUNICATIONS ENGINEERS

Planes, computers, trucks, airports and people — all part of a vast network of communications systems which not only must work, but must be the cornerstone of innovation.

Our accomplishments have been and are dependent on the ingenuity of our people. For our business, telecommunications is a vital link in the success of our operations. We are now seeking several engineers in the following areas who emulate the spirit and resourcefulness of the people at Federal Express.

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At least 4 years demonstrated experience in the installation, diagnosis and maintenance of computerized telecommunications equipment and software is required. An Associate's Degree in Computer Technology or Electrical Engineering is needed with an undergraduate degree preferred.

### Senior Telecommunications Engineer
### Radio

The individual we seek will have a strong background in systems engineering in the radio/teleprocessing industry. Specific knowledge of computer controlled radio equipment and its interface with telecommunications facilities as well as a degree in Electrical Engineering with advanced work is required.

As to be expected with a company of our standing, Federal Express offers superb compensation and a benefits package which ranks among the finest in the industry. If you feel that you are the high-caliber and qualified individual Federal Express is looking for, please send resume specifying the position for which you are applying including salary expectation in confidence to: (No phone calls or agency resumes acceptable)

Terry Bean
Personnel Manager

**FEDERAL EXPRESS CORPORATION**
Box 727, Dept. 3171 / Memphis, TN 38194

FEDERAL EXPRESS

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# LEAD SYSTEMS PROGRAMMER

West Virginia Network for Educational Telecomputing has an immediate opening for a Lead Systems Programmer on a large scale IBM-Compatible system. This position provides supervision and technical assistance to senior level systems programmers. The successful candidate will assume an active role in the conversion of an MVT/VS1/HASP system to MVS/JES2. Requirements include a Master's Degree and four years experience or equivalent, with one year supervisory experience. Experience with MVS, TSO, and/or CICS is desirable. Medium-sized university city provides relaxed academic setting. Salary commensurate with experience. **Apply by February 5, 1982 to: Personnel Officer, WVNET, 837 Chestnut Ridge Rd., Morgantown, WV 26505. Telephone (304) 293-5192.** An Equal Opportunity Employer.

## DIRECTOR OF COMPUTER & INFORMATION SYSTEMS & SPECIAL ASSISTANT TO THE PRESIDENT

### THE PENNSYLVANIA STATE UNIVERSITY

A new position with primary, overall responsibility for computer and information systems for 20 university locations. This position is central to the effective utilization of university-wide computer and management information systems. Will manage CIS related communications systems; information systems software for ACADEMIC AND ADMINISTRATIVE USES; standards for terminals and related equipment, plus data base codes and standards, communications and networking design, evaluates and monitors CIS equipment requestsl, Instructional and research applications and recommends CIS solutions to administrative, instructional and research problems.

The Director reports directly to the President and works closely with other senior academic offers, to whom the four CIS operating units report.

A unique opportunity for someone with qualifications and experience in BOTH COMPUTER AND INFORMATION SYSTEMS MANAGEMENT SKILLS. Clear technical knowledge combined with strong management skills will be required. A person who recognizes technical capabilities and can understand advanced user needs is essential.

Send letter and resume by February 18, 1982, to:

**Donald Dickason, Dean of Admissions**
**Chairperson, Search Committee**
**201 Shields Bldg., Box 3000CW**
**University Park, PA 16802**

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## American Sign & Indicator Corporation

### Spokane, Washington

We have skiing, fishing, hunting, clean air, clean water, 4 seasons, mild winters and summers, mountains, and interesting work.

### Senior Software Engineer

BSEE or Computer Science minimum. MS Computer Science preferred. Five years' experience RT11/RSX operating systems required.

### Electronic Design Engineer

BS or MSEE minimum. Three to five years' design experience with microprocessors and digital electronics. INTEL and/or DEC experience preferred.

### NO HEAD-HUNTERS PLEASE!

Qualified and interested candidates please send your resumes to: **Angela Woods, American Sign & Indicator Corporation, North 2310 Fancher Road, Spokane, WA 99206.** We are an equal opportunity employer.

**AS&I**

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## DATA PROCESSING

SEATTLE & PORTLAND

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SYSTEMS PROGRAMMING $26-40K
Mgmt, CICS, OS/MVS, DOS/VS

APPLICATIONS PROG/ANALYST $20-32K
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P O Box 5013
Cherry Hill, New Jersey 08034
(609) 667-4488

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### PROJECT MANAGEMENT

## INFORMATION SYSTEMS SPECIALIST

Los Angeles home office of well-established software developer at leading edge of large-project management information systems requires applications specialist for key position. Requires current, state-of-the-art knowledge of project management information needs from the project manager's viewpoint, plus in-depth, current technical know-how through hands-on use of leading data base management systems for large main frames or superminis. Software development and/or sales experience will be helpful, but applications experience is the key. Please send resume including complete salary history to:

**Reply to CW-A3167**
**Computerworld**
**Box 880**
**Framingham, MA 01701**

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## SYSTEMS PROGRAMMER

### $32,000.00 Per Year

Leading wholesale grocery distributor has immediate vacancy for systems programmer to support vendor software on an IBM 4341 using DOS/VSE, Power II, ALC, BTAM, VSAM, COBOL. Minimum three years systems programming experience and five years EDP experience. Honeywell experience desirable.

This position offers an opportunity to join a growing technical services staff of a billion dollar plus company. Company benefits include medical, dental and vision care plus excellent career growth opportunity.

Please send detailed resume in confidence to: **Certified Grocers of Calif., Ltd. 2601 Eastern Avenue, Los Angeles, Calif. 90040 Phone (213) 726-2601 Ext. 245**

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## PROGRAMMER

Victory Market, an aggressive regional supermarkets company located in scenic Chenango Valley of Central New York State, has an immediate opening for an experienced Neat 3 Programmer in its Data Processing Department.

Must have minimum of 3 years experience Program maintenance and new program development in addition, experience with VRX, Boss/3, or OLPD is a definite plus.

We offer a competitive salary as well as an exception benefit plan and relocation assistance. If you qualify for this high-growth position, send resume with salary history to:

**Edison Vradenburgh**
**Director Information Systems**
**Victory Market Inc.**
**54 E. Main Street**
**Norwich, NY 13815**
**(607) 335-4780**

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## SYSTEMS ANALYSTS AND PROGRAMMERS FOR SUNBELT LOCATIONS

Job dissatisfaction, complacency, and frustration are the biggest obstacles to overcome to achieve one's career goals. Every day new career opportunities pass us by because we are unaware of their existence. Let us keep you abreast of what your true value is in the market place. Absolutely no obligations, please call or write Keith Reichle, CPC, Data Processing Specialist.

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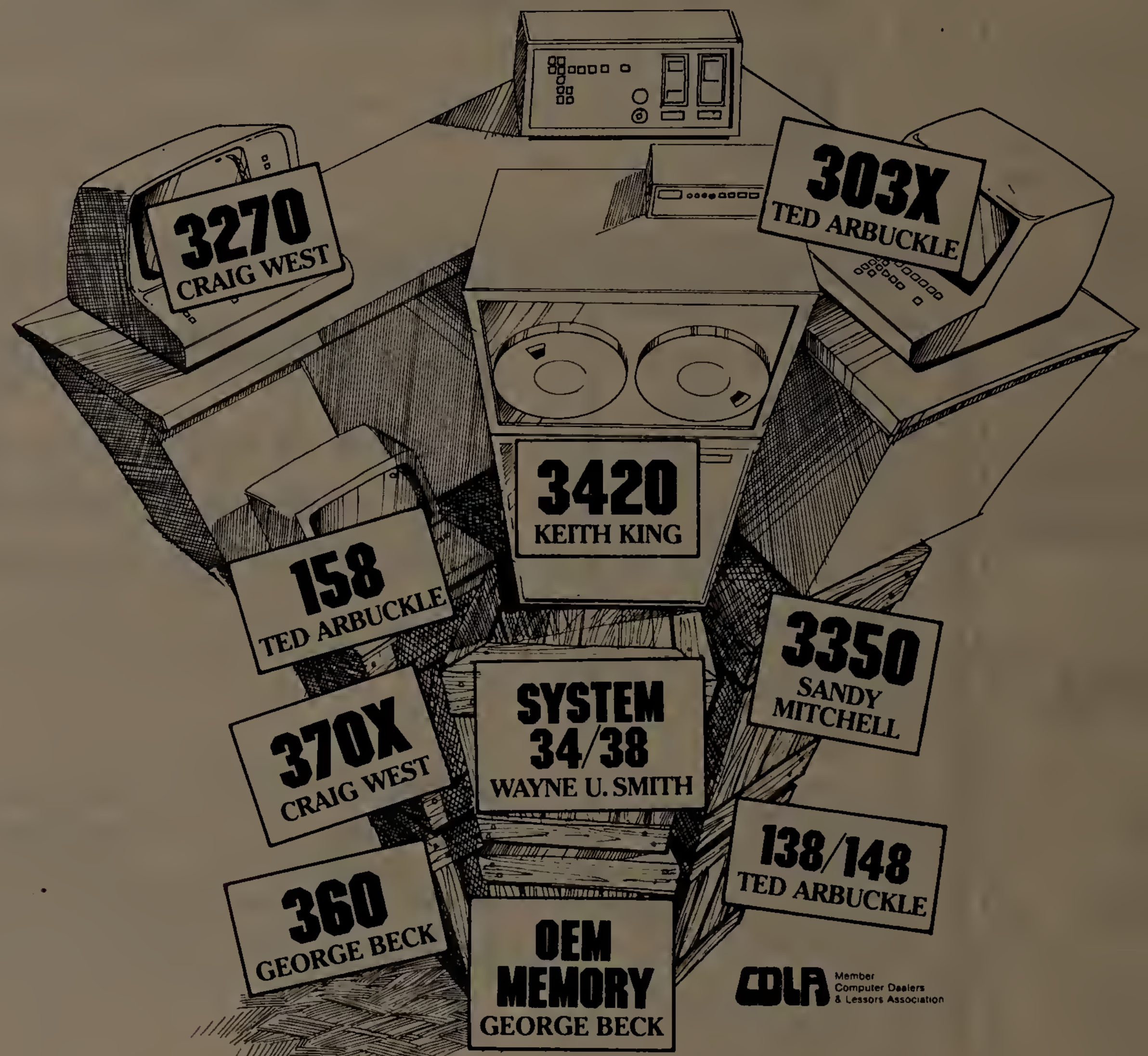

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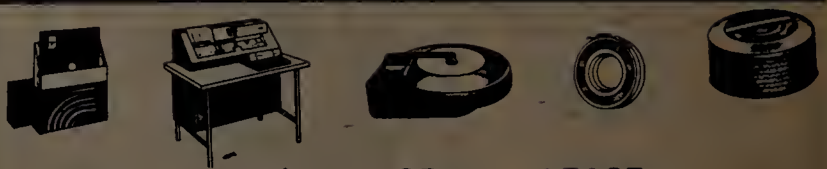

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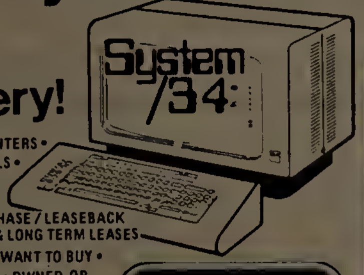

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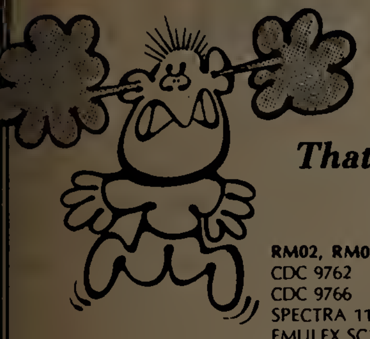

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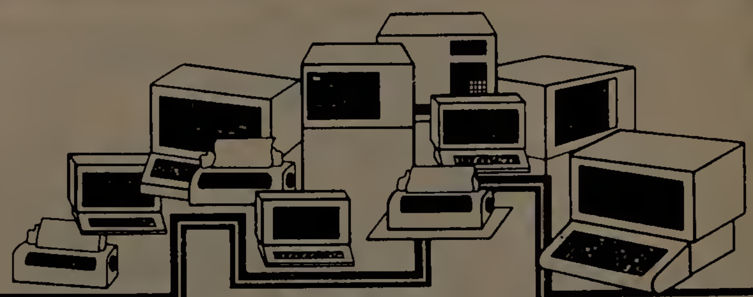

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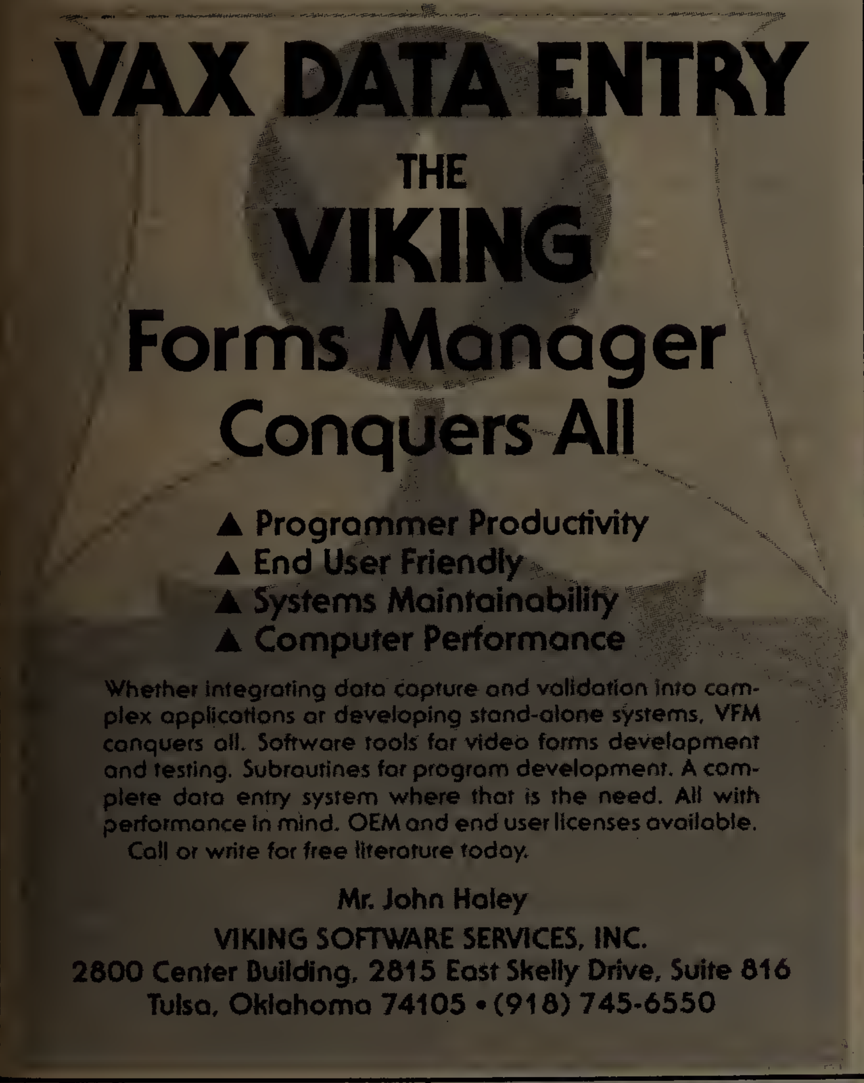

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# ADVERTISERS' INDEX

| | |
|---|---|
| Advanced Digital Products, Inc. | ID/11 |
| AFIPS | ID/23 |
| Alanthus Data Communications | 49 |
| Aluminum Case Co. | 37 |
| Analysts International Corp. | 60 |
| Applied Data Research | 3 |
| Atlantic Management Systems, Inc. | 24 |
| Automated Control Systems | 15 |
| Axios Products, Inc. | 26 |
| John Beall | 71 |
| The Blue Thumb Co. | 25 |
| BBN Computer Corp. | ID/14 |
| California Datalease | 28 |
| Centurion Computer | 17 |
| CGA Computer Products Group | 44 |
| Cincom Systems, Inc./Corporate Division | 39 |
| Community Computer Corp. | 22 |
| Computer Management Research | 38 |
| Computrend | ID/17 |
| Control Concepts Corp. | ID/2 |
| Control Data Corp./Institute for Advanced Technology | 68 |
| Control Data Institute | 27 |
| Cullinane Database Systems, Inc. | 77 |
| CW Extra! | 29 |
| CW International | 76 |
| CW Office Automation | 60 |
| CW Supplement | ID/10 |
| CW Week | 54-55, 73 |
| Cylix | 38 |
| Database Management, Inc. | 18 |
| Data General | 30-31, 62-63 |
| Datapoint Corp. | 50 |
| Dataprocessing Design | 74 |
| Datapro Research Corp. | 45 |
| Dataproducts | 64-65 |
| Deltak, Inc. | 51 |
| Digital Equipment Corp./Educational Services | 35 |
| Digital Equipment Corp./Terminals | ID/12-ID/13 |
| Digital Equipment Corp./TPL | 14 |
| Drexel, Burnham, Lambert | ID/15 |
| DTSS | ID/7 |
| Duquesne Systems | 41 |
| Eastman Kodak Co. | 66 |
| Four Phase Systems | 40 |
| General Electric | 56 |
| General Terminal Corp. | 19 |
| Genesys | 46 |
| Hewlett Packard/BCG | ID/20-ID/21, 43 |
| IBM | ID/4-ID/5, 23 |
| Image Data | 14 |
| Infodata Systems | 48 |
| Informatics | ID/19 |
| Information Concepts | 27, 76 |
| Innovation Data Processing | 9 |
| Invitational Computer Conference | ID/16 |
| K/W Control Systems, Inc. | 34 |
| Lear Siegler | ID/24 |
| Lee Data Corp. | ID/9 |
| Magnuson | 58-59 |
| Management Science America | 112 |
| Management Techniques | 34 |
| MCAUTO Computer Services | 22 |
| McDonnell Douglas Finance Corp. | 24 |
| Memorex-Communications | ID/11 |
| Memorex Media Prod. Group/RMCD | 42 |
| MTI | 56 |
| National Computer Maintenance | 19 |
| Newcorp Products | 26 |
| Newman Computer Exchange, Inc. | ID/22 |
| Para Research | ID/22 |
| Prentice Hall, Inc., College Division | 16 |
| Professional Consulting Services | 13 |
| Qwikterm | 52 |
| Racal Vadic | 57 |
| Rockie Smith Enterprises | ID/8 |
| Saturn Systems, Inc. | 46 |
| Science Research Assoc., Inc. | 36 |
| SDI | 17 |
| Selanar | 78 |
| Signal Technology, Inc. | 21 |
| Software AG | 47 |
| Solutions, Inc. | 22 |
| Storage Technology Corp. | 75 |
| Syncsort | 7 |
| Synergistics | 24 |
| Technology Transfer Institute | 79 |
| Televideo Systems, Inc. | ID/6 |
| Telex Computer Products, Inc. | 72 |
| Terminals Unlimited | 18 |
| Texas Instruments, Inc. | ID/18, 20 |
| Texprint | 73 |
| Tone Software | 24 |
| Triangle Systems, Inc. | 26 |
| Universal Data Systems | 70 |
| Wang Institute | 21 |
| Westwood Associates | 20 |
| Yourdon | 5 |
| Zentec, Inc. | 37 |

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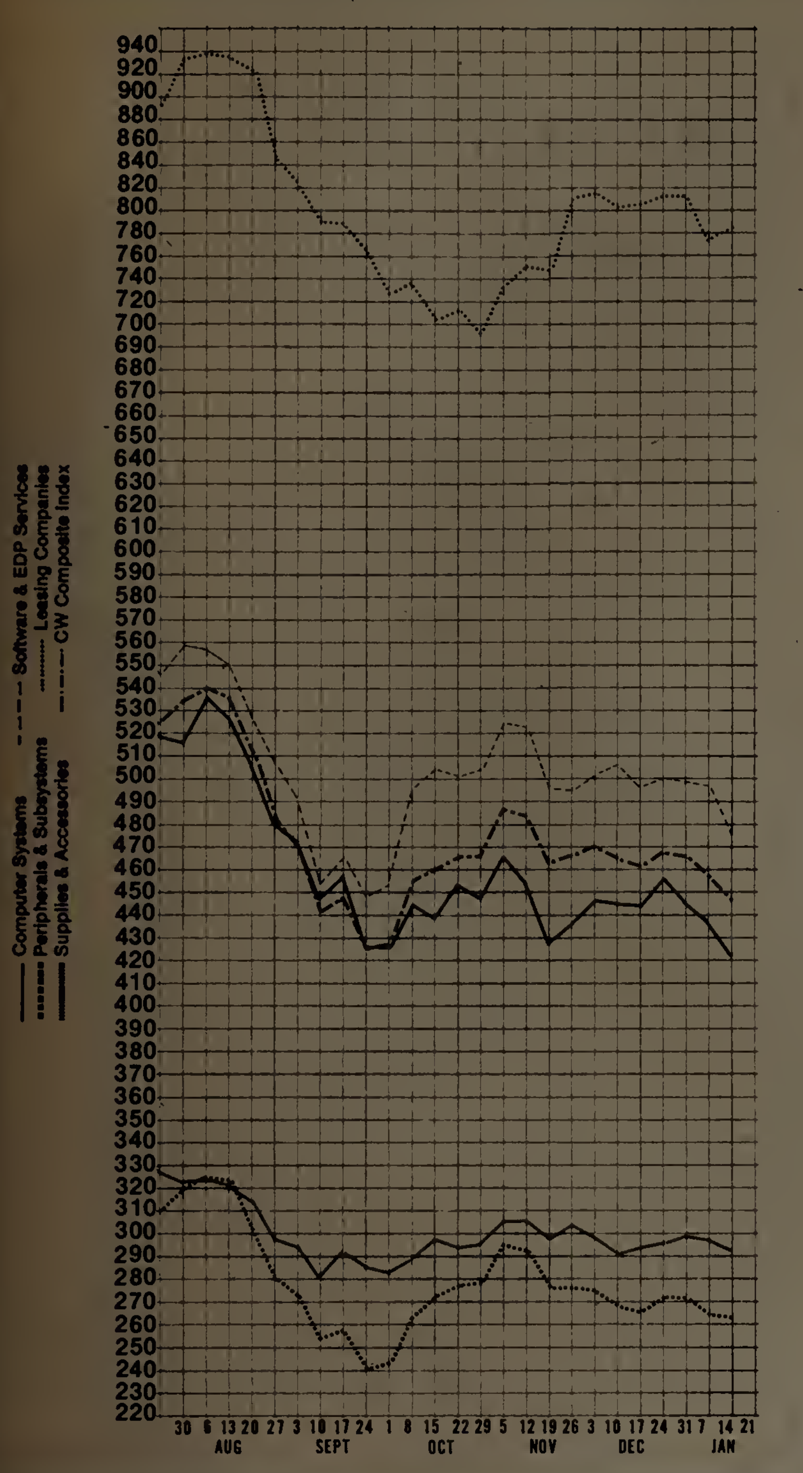

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| O | COMPUTER AUTOMATION | 9- 28 | 10 1/2 | + 3/4 | +7.6 |
| N | CONTROL DATA CORP | 19- 42 | 32 | -2 1/2 | -7.2 |
| N | CRAY RESEARCH INC | 29- 49 | 32 1/8 | -3 1/4 | -9.1 |
| N | DATA GENERAL CORP | 42- 87 | 50 1/2 | -1 3/4 | -3.3 |
| N | DATAPOINT CORP | 40- 68 | 45 3/4 | -3 7/8 | -7.8 |
| N | DIGITAL EQUIPMENT | 80-113 | 80 3/4 | -3 3/4 | -4.4 |
| A | EECO INC | 7- 19 | 7 | - 3/4 | -9.6 |
| N | ELECTRONIC ASSOC. | 5- 13 | 7 | + 5/8 | +9.8 |
| N | FOUR-PHASE SYSTEMS | 18- 46 | 35 1/2 | -2 7/8 | -7.4 |
| N | FOXBORO | 42- 62 | 53 3/4 | +1 | +1.8 |
| O | FULCRUM COMP GRP | 1- 3 | 3/8 | 0 | 0.0 |
| O | GENERAL AUTOMATION | 6- 16 | 6 1/8 | + 1/8 | +2.0 |
| N | HARRIS CORP | 36- 60 | 36 3/8 | -2 1/8 | -5.5 |
| N | HEWLETT-PACKARD CO | 33- 54 | 38 7/8 | + 5/8 | +1.6 |
| N | HONEYWELL INC | 63-115 | 62 7/8 | -6 1/4 | -9.0 |
| N | IBM | 49- 73 | 57 3/8 | + 5/8 | +1.1 |
| O | MAGNUSON COMP SYSTS | 10- 32 | 9 5/8 | -1 1/8 | -10.4 |
| N | MANAGEMENT ASSIST | 9- 26 | 9 3/8 | -1 1/4 | -11.7 |
| O | MINI-COMPUTER SYST | 1- 4 | 3/4 | + 1/8 | +20.0 |
| N | MODULAR COMPUTER SYS | 7- 32 | 8 3/8 | - 1/4 | -2.8 |
| N | MOHAWK DATA SCI | 11- 32 | 12 1/4 | -1 3/4 | -12.5 |
| N | NCR | 39- 76 | 40 1/2 | -1 3/4 | -4.1 |
| N | PRIME COMPUTER INC | 18- 49 | 20 1/8 | -1 7/8 | -8.5 |
| N | PERKIN-ELMER | 21- 36 | 23 3/4 | -2 3/8 | -9.0 |
| N | SPERRY CORP | 30- 55 | 31 1/4 | -2 3/4 | -8.0 |
| O | TANDEM COMPUTERS INC | 13- 35 | 25 3/4 | -1 1/4 | -4.6 |
| N | TEXAS INSTRUMENTS | 71-151 | 70 3/4 | -5 1/2 | -7.2 |
| A | WANG LABS. | 23- 46 | 26 1/2 | -1 7/8 | -6.6 |
| | LEASING COMPANIES | | | | |
| O | BOOTHE FINANCIAL CP | 18- 29 | 22 1/4 | + 1/4 | +1.1 |
| N | COMDISCO INC | 16- 27 | 23 1/2 | -1 1/2 | -6.0 |
| B | COMMERCE GROUP CORP | 1- 2 | 5/8 | - 1/8 | -16.6 |
| O | COMPUTER INVSTRS GRP | 1- 4 | 1/4 | 0 | 0.0 |
| O | CONTINENTAL INFO SYS | 4- 9 | 6 3/4 | +1 1/4 | +22.7 |
| A | DCL INC | 3- 4 | 3 3/4 | 0 | 0.0 |
| N | DPF INC | 5- 13 | 10 1/2 | 0 | 0.0 |
| O | ITEL | 1- 15 | 3/4 | + 1/8 | +20.0 |
| O | LEASPAC CORP | 1- 2 | 1/8 | 0 | 0.0 |
| N | RELIANCE GROUP INC | 65-101 | 98 | 0 | 0.0 |
| N | U.S. LEASING | 18- 30 | 22 1/2 | -2 1/4 | -9.0 |

EXCH: N=NEW YORK; A=AMERICAN; P=PHIL-BALT-WASH; B=BOSTON
L=NATIONAL; M=MIDWEST; O=OVER-THE-COUNTER
O-T-C PRICES ARE BID PRICES AS OF 3 P.M. OR LAST BID
(1) TO NEAREST DOLLAR

| EXCH | | PRICE | | | |
|---|---|---|---|---|---|
| | | 1981-82 RANGE (1) | CLOSE JAN 13 1982 | WEEK NET CHNGE | WEEK PCT CHNGE |
| | SOFTWARE & EDP SERVICES | | | | |
| O | ADVANCED COMP TECH | 2- 6 | 2 1/4 | - 1/4 | -10.0 |
| O | ADVANCED SYSTEMS INC | 10- 15 | 13 | -2 | -13.3 |
| O | ANACOMP INC | 10- 19 | 10 | -1 7/8 | -15.7 |
| O | ANALYSTS INTL CORP | 3- 14 | 6 1/4 | - 1/4 | -3.8 |
| A | APPLIED DATA RES. | 13- 25 | 17 7/8 | -2 3/4 | -13.3 |
| B | ASTRADYNE COMP IND | 4- 5 | 4 1/8 | - 1/4 | -5.7 |
| N | AUTOMATIC DATA PROC | 22- 32 | 25 1/4 | - 1/4 | -0.9 |
| O | CGA COMPUTER ASSOC | 4- 25 | 6 | - 1/4 | -4.0 |
| O | COMPUTER HORIZONS | 1- 5 | 3 | - 1/8 | -4.0 |
| O | COMPUTER NETWORK | 4- 9 | 4 1/8 | + 1/8 | +3.1 |
| N | COMPUTER SCIENCES | 12- 30 | 13 5/8 | + 1/2 | +3.8 |
| O | COMPUTER TASK GROUP | 10- 23 | 10 1/2 | + 1/4 | +2.4 |
| O | COMPUTER USAGE | 2- 10 | 3 | 0 | 0.0 |
| O | COMSERV CORP | 9- 16 | 12 1/4 | -2 1/4 | -15.5 |
| O | COMSHARE | 7- 21 | 6 1/2 | 0 | 0.0 |
| O | CULLINANE DATABASE | 15- 37 | 28 | -2 1/2 | -8.1 |
| O | DATA DIMENSIONS INC | 0- 4 | 3/8 | 0 | 0.0 |
| O | DATATAB | 1- 4 | 1 5/8 | 0 | 0.0 |
| O | DSI CORP | 4- 9 | 4 5/8 | - 1/2 | -9.7 |
| O | DYATRON CORP | 3- 11 | 3 3/8 | - 1/4 | -6.8 |
| N | ELECTRONIC DATA SYST | 15- 30 | 21 7/8 | -1 3/4 | -7.4 |
| O | INFORMATICS INC | 17- 34 | 23 1/4 | -1 3/4 | -7.0 |
| O | INSYTE CORP | 1- 3 | 2 | 0 | 0.0 |
| O | IPS COMPUTER MARKET. | 1- 4 | 1 | 0 | 0.0 |
| O | KEANE ASSOCIATES | 4- 8 | 4 1/4 | 0 | 0.0 |
| A | LOGICON | 23- 38 | 29 3/4 | + 1/8 | +0.4 |
| O | MNGT SCI AMER INC | 17- 26 | 21 | - 3/4 | -3.4 |
| O | MATHEMATICA INC | 12- 24 | 21 1/2 | -1 | -4.4 |
| O | MATHEMATICAL APP GRP | 15- 28 | 15 1/2 | -1 1/2 | -8.8 |
| O | NATIONAL DATA CORP | 14- 28 | 18 | -1 7/8 | -9.4 |
| N | PLANNING RESEARCH | 5- 13 | 5 5/8 | - 1/4 | -4.2 |
| O | PROGRAMMING & SYS | 1- 2 | 1 1/8 | 0 | 0.0 |
| O | RAPIDATA INC | 5- 17 | 15 3/4 | 0 | 0.0 |
| O | REYNOLDS & REYNOLD | 16- 26 | 19 1/2 | + 1/4 | +1.2 |
| O | SEI CORP | 17- 28 | 23 1/2 | - 3/4 | -3.0 |
| O | STSC INC | 6- 28 | 6 1/4 | -1 1/4 | -16.6 |
| O | SCIENTIFIC COMPUTERS | 7- 16 | 7 1/2 | - 1/4 | -3.2 |
| O | SOFTWARE AG | 11- 23 | 13 | 0 | 0.0 |
| N | TYMSHARE INC | 23- 58 | 25 1/4 | -2 1/4 | -8.1 |
| A | URS CORP | 11- 18 | 12 5/8 | - 1/8 | -0.9 |
| N | WYLY CORP | 7- 20 | 8 | - 1/2 | -5.8 |
| | PERIPHERALS & SUBSYSTEMS | | | | |
| N | AM INTERNATIONAL | 4- 25 | 4 1/8 | - 1/4 | -5.7 |
| A | ANDERSON JACOBSON | 10- 26 | 12 7/8 | + 3/8 | +3.0 |
| O | AUTO-TROL TECHNOLOGY | 9- 62 | 9 3/4 | +1 | +11.4 |
| O | BANCTEC INC | 20- 35 | 27 3/4 | -3 | -9.7 |
| O | BEEHIVE INT'L | 6- 18 | 7 7/8 | - 5/8 | -7.3 |
| A | BOLT,BERANEK & NEW | 9- 25 | 10 | 0 | 0.0 |
| O | CAMBEX CORP | 2- 9 | 2 5/8 | + 1/8 | +5.0 |
| N | CENTRONICS DATA COMP | 7- 40 | 12 7/8 | - 3/8 | -2.8 |
| A | CETEC CORP | 4- 9 | 4 3/8 | 0 | 0.0 |
| O | COMPUTER DEVICES INC | 4- 10 | 7 | 0 | 0.0 |
| O | COGNITRONICS | 3- 11 | 2 7/8 | 0 | 0.0 |
| O | COMPUTER COMMUN. | 1- 8 | 7/8 | 0 | 0.0 |

| EXCH | | PRICE | | | |
|---|---|---|---|---|---|
| | | 1981-82 RANGE (1) | CLOSE JAN 13 1982 | WEEK NET CHNGE | WEEK PCT CHNGE |
| A | COMPUTER CONSOLES | 18- 28 | 21 | -1 1/4 | -5.8 |
| O | COMPUTER TRANSCEIVER | 3- 9 | 6 | + 1/2 | +9.0 |
| N | COMPUTERVISION CORP | 20- 48 | 28 3/4 | -1 7/8 | -5.9 |
| N | CONRAC CORP | 17- 28 | 24 | - 1/4 | -1.0 |
| A | DATA ACCESS SYSTEMS | 4- 23 | 4 | -1 | -20.0 |
| A | DATAPRODUCTS CORP | 18- 44 | 18 1/2 | - 7/8 | -4.2 |
| O | DATUM INC | 2- 5 | 1 7/8 | + 1/4 | +15.3 |
| O | DAVID JAMISON CARLYL | 3- 8 | 5 3/4 | 0 | 0.0 |
| O | DECISION DATA COMPUT | 3- 6 | 2 7/8 | 0 | 0.0 |
| O | DELTA DATA SYSTEMS | 2- 4 | 2 | + 1/8 | +6.8 |
| O | DATARAM CORP | 4- 15 | 8 7/8 | 0 | 0.0 |
| N | ELECTRONIC M & M | 3- 8 | 3 | - 1/8 | -4.0 |
| O | EVANS & SUTHERLAND | 18- 40 | 25 | -1 1/2 | -5.6 |
| O | FABRI-TEK | 2- 6 | 5 3/4 | +1 3/8 | +31.4 |
| O | GENERAL COMPUTER SYS | 1- 12 | 7 | 0 | 0.0 |
| N | GEN'L DATA COMM IND | 8- 18 | 8 7/8 | + 3/4 | +9.2 |
| O | GENERAL TERMINAL CP | 1- 4 | 7/8 | 0 | 0.0 |
| N | HAZELTINE CORP | 18- 35 | 25 1/8 | -1 1/4 | -4.7 |
| O | INFORMATION INTL INC | 8- 17 | 11 | 0 | 0.0 |
| O | INTEL CORP | 21- 51 | 20 3/4 | -1 1/4 | -5.6 |
| O | IPL SYSTEMS INC | 6- 15 | 6 1/2 | - 1/4 | -3.7 |
| A | LUNDY ELECTRONICS | 7- 18 | 8 1/4 | 0 | 0.0 |
| A | MSI DATA CORP | 11- 27 | 17 1/2 | +1 1/4 | +7.6 |
| O | NETWORK SYSTEMS CORP | 14- 25 | 18 3/8 | -1 5/8 | -8.1 |
| O | OMEX | 2- 12 | 8 | 0 | 0.0 |
| N | PARADYNE CORP | 25- 52 | 37 1/2 | -1 5/8 | -4.1 |
| A | PENRIL CORP | 8- 17 | 8 7/8 | + 3/8 | +4.4 |
| O | RAMTEK CORP | 9- 23 | 12 1/2 | - 7/8 | -6.5 |
| N | RECOGNITION EQUIP | 6- 21 | 6 | - 1/2 | -7.6 |
| O | SCAN DATA | 1- 5 | 3/4 | 0 | 0.0 |
| N | STORAGE TECHNOLOGY | 18- 40 | 31 1/8 | -3 1/4 | -9.4 |
| O | SYKES DATATRONICS | 8- 34 | 24 1/4 | -2 1/4 | -8.4 |
| A | T BAR INC | 12- 19 | 12 1/8 | -1 3/8 | -10.1 |
| A | TEC INC | 4- 7 | 5 1/2 | - 3/8 | -6.3 |
| N | TEKTRONIX INC | 46- 70 | 51 3/8 | -3 5/8 | -6.5 |
| N | TELEX | 5- 9 | 6 3/8 | + 1/4 | +4.0 |
| O | TESDATA SYSTEMS CP | 6- 17 | 7 1/4 | 0 | 0.0 |
| A | TIMEPLEX INC | 8- 19 | 9 1/4 | 0 | 0.0 |
| O | WILTEK INC | 1- 3 | 1 7/8 | + 1/8 | +7.1 |
| | SUPPLIES & ACCESSORIES | | | | |
| N | AMERICAN BUS PRODS | 11- 17 | 12 1/8 | 0 | 0.0 |
| O | BALTIMORE BUS FORMS | 1- 2 | 1/2 | 0 | 0.0 |
| N | BARRY WRIGHT | 15- 24 | 15 7/8 | -1 5/8 | -9.2 |
| O | CYBERMATICS INC | 1- 2 | 1 | - | -5.5 |
| A | DUPLEX PRODUCTS INC | 12- 17 | 13 1/2 | 0 | 0.0 |
| N | ENNIS BUS. FORMS | 15- 23 | 19 3/4 | - 1/2 | -2.4 |
| N | 3M COMPANY | 48- 65 | 52 1/4 | -1 5/8 | -3.0 |
| O | MOORE CORP LTD | 27- 38 | 31 7/8 | - 5/8 | -1.9 |
| N | NASHUA CORP | 17- 33 | 17 1/2 | - 1/4 | -1.4 |
| O | STANDARD REGISTER | 30- 41 | 34 | - 3/4 | -2.1 |
| A | TAB PRODUCTS CO | 15- 30 | 16 7/8 | - 1/2 | -2.8 |
| N | WALLACE BUS FORMS | 22- 36 | 33 3/8 | + 1/4 | +0.7 |

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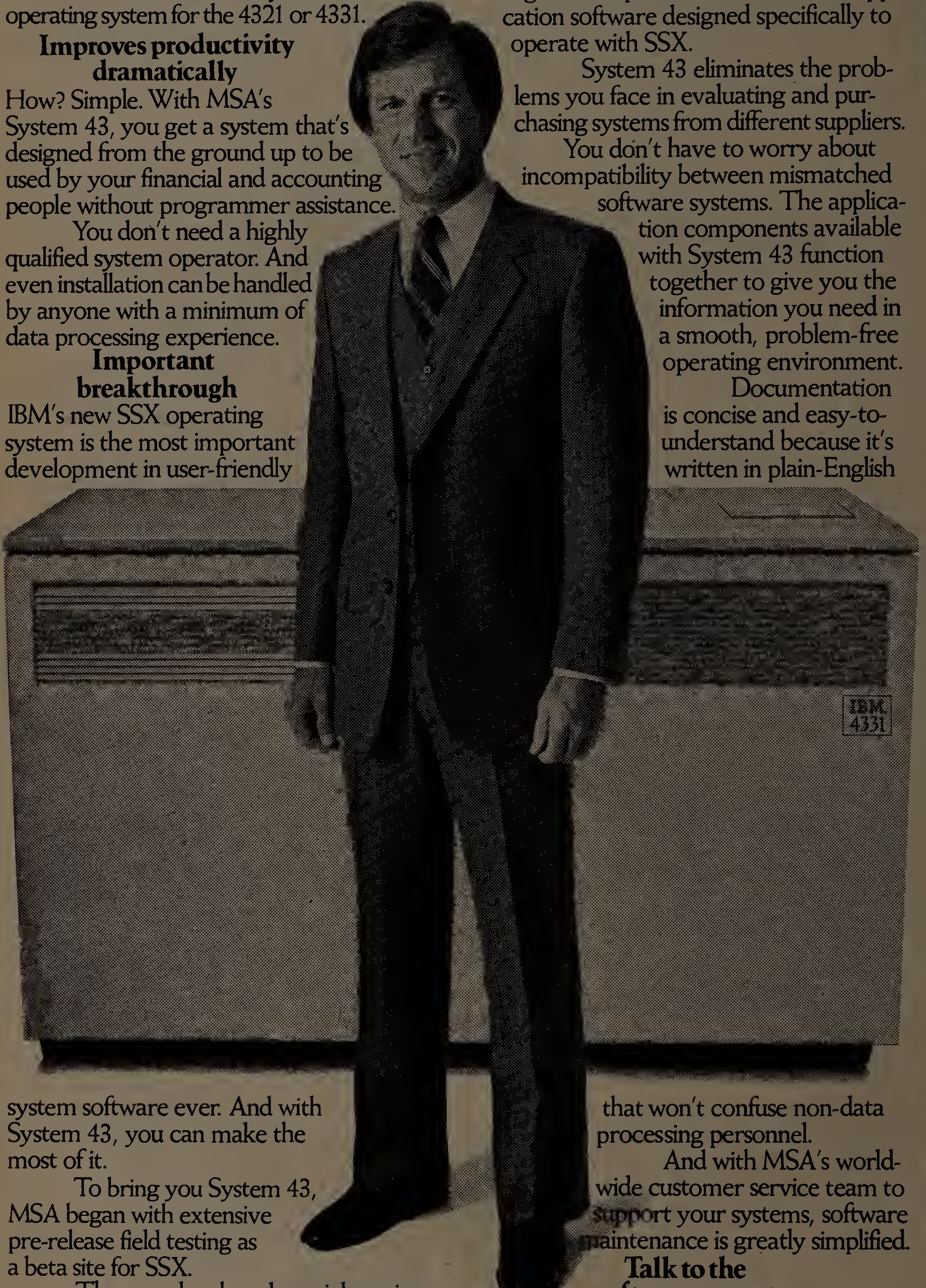

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